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THE

ELEMENTS and *PRACTICE*

OF

RIGGING

AND

SEAMANSHIP.

ILLUSTRATED WITH ENGRAVINGS.

IN TWO VOLUMES.——VOL. I.

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PREFACE.

IN Great Britain the naval arts are indigenous, and flourish with a superiority, which is the result of a vast demand for their various labours. But, singular though it is, the British Nation cannot boast of having taught or considerably improved them by the efforts of her press. Whatever may have been the cause of this does not at present much import; although curiosity would excite us to investigate, why these subjects have more engaged the attention of French authors: perhaps it might be ultimately traced to the consciousness of practical superiority, or to the different national characteristic; for the reserve of an Englishman is almost proverbial.

The germe of this work was a small and incomplete treatise on sail making, which some years ago came into the possession of the publisher. In the course of rendering that fit for general use, the reciprocal dependence of the naval arts was discerned; and it was instantly resolved to collect them all together, although public materials were few, and private communications were with difficulty to be obtained. The subject of ship-building seemed capable of being, with propriety, treated as a distinct pursuit; and these considerations, added to the reflection that much was already known upon that subject, produced the present labours upon the arts relative to or connected with the RIGGING OF A SHIP.

When thus far advanced, a seaman rebuked the deficiency, by asking if a ship, completely rigged, was to remain an inert body. Of what use, said he, are these masts, and stays, and braces; these blocks, and sails, and anchors? Pray put your complex machine in motion; send her to sea, and send her thither with directions, to act singly or in fleets. Hence was perceived the necessity of an union between the naval arts and the purposes to which they are applied.

This little history of our progress will perhaps strikingly illustrate their intimate connection. The seaman, who knows what can be and is performed by the naval artist, and who knows the construction and powers of the minutest parts of a ship's rigging, becomes a better judge of how the naval arts may be improved, or how more effectually directed to the purposes of seamanship. While the naval artist, on the other hand, who is acquainted with the objects of a seaman's pursuit, will be better enabled so to direct the arts he professes, as to facilitate the attainment of those objects. Thus each reflects a light upon the other; and, from the study of both, solid improvements in naval science are to be expected. We speak not without foundation; it is from this joint knowledge, that Captain Edward Pakenham produced his excellent inventions concerning masts and rudders.

The vanity of man makes him talk of the difficulties he has surmounted; the greater the difficulties, the more is his vanity gratified. Let it not, however, be attributed to this passion, if we mention a few of those impediments that presented themselves to us; but rather let them be taken as reasons, for our soliciting indulgence towards any errors that may, from that cause, have crept into the work.

Actual workmen in each art were necessarily consulted, and their differing methods required comparison by others, in order that correct principles might be established, and the best practice explained. The disinclination of many to be open in their communications, from the possession of

ſuppoſed ſecrets, has often oppoſed the advancement of theſe volumes, and often chilled the ardour of our perſeverance. Nor was the path always ſmooth, where even liberality was found; for the beſt practical workman and the beſt practical ſeaman were generally inexpert in the uſe of the pencil; they could deſcribe, but not delineate; and artiſts were therefore employed, whoſe taſk was to elucidate by drawings the moſt complex figures and operations. Hundreds of the technical phraſes were vainly ſought for in the common dictionaries, and even in the maritime vocabularies; and thence it became neceſſary to explain and prefix them to each art. The language of the workman was not ſufficiently exact for the public eye, and this was obliged to paſs under reviſion. The publications which at preſent exiſt upon the making of maſts, ropes, anchors, ſails, blocks, and upon rigging, are in the whole extremely few and incorrect: from them, therefore, much aſſiſtance could not be derived; making an exception, however, in favour of the Traité du Greement of M. Leſcallier, which afforded ſome hints that correſponded with the practice in the Britiſh navy, and which were of courſe adopted. Thus, from the number of objects and of agents, the tedioufneſs of our progreſs may be conceived; but theſe labours will be amply repaid, if our theories are acknowledged to be (what we hope they are) theories demonſtrated, and our practice of the different arts, the practice of their beſt artificers.

Upon the two ſubjects of SEAMANSHIP and NAVAL TACTICS we owe many obligations to the writers of France. It has been long admitted that M. Bouguer has given the true theory of working ſhips, and that M. Morogues is the moſt enlightened author on naval tactics. M. Bouguer is too mathematically abſtruſe for general uſe: of more benefit, therefore, is the work of M. Bourdé de Villehuet, named Le Manœuvrier; becauſe this latter gentleman has treated the laws of motion in fluids with regard to ſhips, and the effects of the different ſails and of the rudder, in a manner equally correct and more acceſſible to general comprehenſion; and he has furthermore ſhewn the exact correſpondence of practice with theory. From theſe ſources we have drawn much; but not from theſe alone: we have reſorted to writers and ſeamen of our own country, and gained from them much excellent practice.

The NAVAL TACTICS will, we truſt, be found more complete than any hitherto publiſhed; for all that is known of them, from M. Morogues to the Viſcount de Grenier, is ſyſtematically arranged, and greatly elucidated by numerous engravings.

The foſter-parent of this work is none other than the publiſher. In the long courſe of his buſineſs, particularly confined to maritime and nautical productions, he became acquainted with the wiſhes and the wants of the naval world. Sincerely deſirous to contribute the efforts of his ſtation to the promotion of maritime ſcience, he has employed years in collecting materials for it; he ſought out the moſt ſkilful in their arts, and the moſt judicious in the ſciences. And at length, with grateful thanks to many DISTINGUISHED CHARACTERS IN THE BRITISH NAVY who honoured him with their communications, and to thoſe LIBERAL NAVAL ARTISTS who yielded him their aſſiſtance, he delivers, to the Britiſh nation, THE ELEMENTS AND PRACTICE OF RIGGING AND SEAMANSHIP.

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THE EXPLANATION OF THE FRONTISPIECE.

The female figure reprefents Naval Science feated in a marine car. The triton is emblematical of the power of the ocean, as the figure at the back of the car is that of the winds.

Both feem to confefs the dominion of Naval Science, by conducting the car in obedience to her commands.

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MISCELLANEOUS.—Vol. II.

Captain Edward Pakenham's invention for faving a rudder when beaten off
——— fubftitute for a rudder when loft
——— method of reftoring mafts, when wounded
The upper deck of a feventy-four gun fhip, delineating an arrangement of the hammocks for the crew
} In the chapter of mifcellanies which follows the fubject of naval tactics.

Mr. Hill's invention for ftopping leaks occafioned by gun fhot holes will be found in the plate of ballafting, facing - 286

TABLES OF THE QUANTITIES AND DIMENSIONS OF THE STANDING AND RUNNING RIGGING.—Vol. II.

Commencing a new Series of Pages, after the Chapter of MISCELLANIES.

Standing and running rigging to fhips of 110 and 100 guns	1	Standing and running rigging to fhips of 28 guns	91
——— 98 and 90 guns	11	——— 24 guns	101
——— 80 guns	21	——— 22 and 20 guns	111
——— 74 guns	31	——— floops of 16 and 14 guns	121
——— 64 guns	41	——— brigs of 160 tons	131
——— 50 and 44 guns	51	——— cutters of 200 tons	141
——— 38 guns	61	——— floops of 130 tons	143
——— 36 guns	71	——— ketches of 150 tons	145
——— 32 guns	81		

THE READER WILL PLEASE TO ATTEND TO THE FOLLOWING CORRECTIONS, FOR THE TABLES OF STANDING AND RUNNING RIGGING, WHICH ARE AT THE END OF THE SECOND VOLUME.

ERROR in the Tonnage of 98 and 90 Gun Ships: 2290 and 2164 Tons refpectively fhould be 1931 and 1827 Tons refpectively.

In the Table for a Cutter of 200 Tons, add, after *Outer Tye*, 6 in. | 19½ fathoms. | as the circumference and length of the rope neceffary for the outer Tye.

When a Cutter has a Topmaft with Crofs-trees, it has two pair of topmaft fhrouds and one pair of backftays, or elfe three pair of topmaft fhrouds only.

In the Table for a Ketch of 150 Tons, page 147, *Length, &c.* fhould be *Length of the firft warp of the Main Shrouds.*

By a recent Order of the Navy Board, the Main and Fore Sails of all Ships in the Royal Navy are to have double tacks; for which the allowed quantity is twice the length of the fingle tacks, but the rope is to be of the fame fize as that ufed for the fheets.

For Tarred Lines three-quarter rope is commonly ufed; the length of each of thefe lines is generally 108 Feet; and, therefore, whenever it directs one, two, or three, tarred lines, it is meant that there fhould be once, twice, or thrice, that length.

Sheets and Buntlines for Top Gallant Sails are omitted in thefe Tables, becaufe they are always taken out of the Stores allowed for Sea.

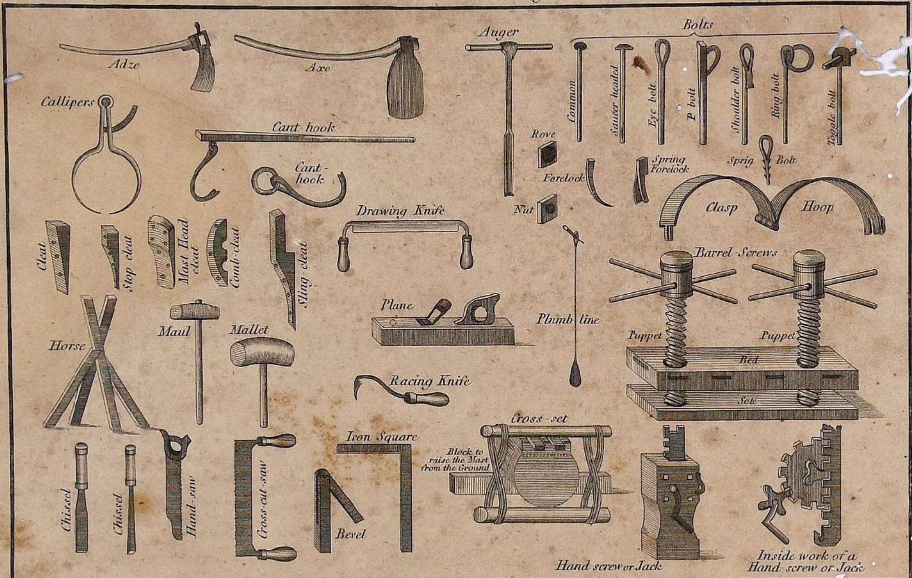
To each fet of Main and Fore Topmaft Shrouds, a fifter block is allowed.

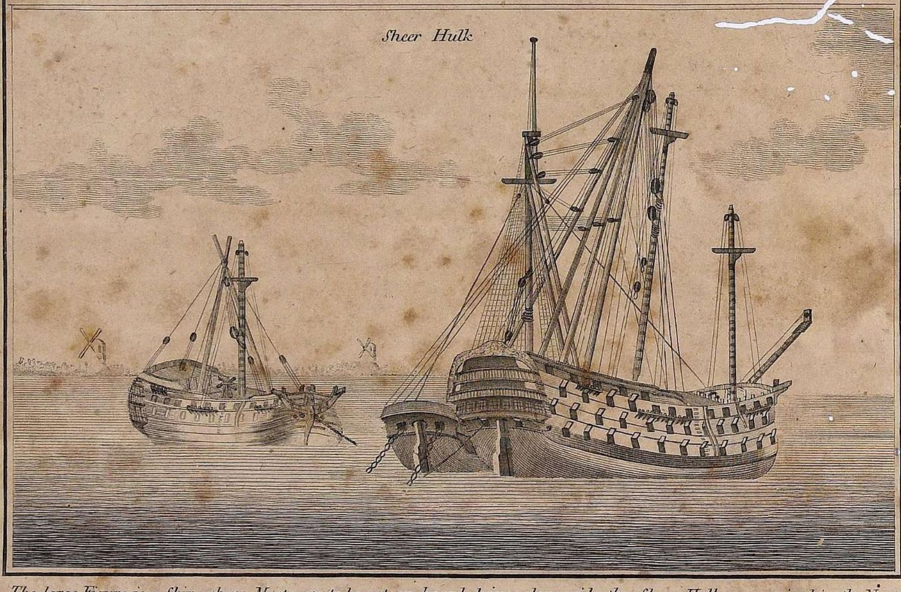
No Seizings are allowed but for fuch blocks as require rope: all other blocks are to be feized with marline or fpunyarn, allowed for fitting the rigging in the houfe.

All running rigging had better be got out in the coil, and cut to proper lengths when reeved on-board.

MAST-MAKING.

Tools for Mast Making





The large Figure is a Ship, whose Masts are to be got on-board, lying along side the Sheer Hulk, as practised in the Navy. The small Ship shews the mode of fixing the Sheers in a Merchant Ship, and getting her Masts on board.

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DESCRIPTION,

USE, AND POSITION,

OF

MASTS, BOWSPRITS, YARDS, &c.

MASTS are made of long fir-trees cylindrically rounded: their ſides, curving lengthways, form an arch of an ellipſis, reſembling the ſhaft of a column, elevated perpendicularly upon the keelſon, to which are attached the yards, ſails, and rigging.

Thoſe made of ſingle trees are called *pole-maſts*; thoſe made of ſeveral trees joined together *made-maſts*.

In maſting it is to be obſerved, that the complete height of a maſt is gained by erecting one maſt on the top of another.

The one fixed upon the keelſon is called the lower or ſtanding maſt; the next in height above that the topmaſt; the next the topgallant-maſt; and it is ſometimes prolonged by a royal-maſt, uſed in light breezes.

Maſts are to extend the ſails by means of their yards. When the number of maſts is multiplied, the yards muſt be ſhortened, or they would entangle each other in working: by this, too, the ſails would be narrowed, and would receive too ſmall a portion of wind for the force required. If, on the contrary, there is not a ſufficient number of maſts, the yards would be unmanageable from their ſize. Experience has therefore proved, that, in large veſſels, three maſts and a bowſprit, in ſmaller veſſels, two maſts and a bowſprit, and in the ſmalleſt, one maſt and a bowſprit, are the moſt advantageous numbers for nautical purpoſes.

The beſt poſition of the maſts is that from whence there reſults an equilibrium between the reſiſtance of the water on the body of the ſhip, on one part, and of the direction of their effort on the other.

The maſts are thus generally placed in the royal navy. The centre of the foremaſt to be abaft the aftſide of the rabbet of the ſtem, or inſide of the plank on the lower deck, one ninth part of the length of the lower deck. The centre of the main-maſt to be abaft the aftſide the rabbet of the ſtem on the lower deck, five ninths of its length: and the centre of the mizen-maſt to be abaft the aftſide of the rabbet of the ſtem on the lower deck, ſeventeen twentieths of its length.

In the merchant-ſervice, they are not ſo ſtrictly confined reſpecting the poſition of the mainmaſt, though it is generally placed near the midſhips of the ſhip; but artificers differ widely in placing the fore and mizen maſts.

The inclination of the lower maſts is governed by the trim of the ſhip. Experience has proved, that ſome will ſail beſt with their maſts raking forward, others, aft; conſequently, no ſtrict rule can be laid down; but in general they rake aft.

It is the opinion of many, that ſhort and broad veſſels, with one or two maſts, ſhould have that maſt neareſt the centre rake much aft; and in long floored veſſels the maſts ſhould be upright. When maſts touch the partners, they are liable to ſpring or be carried away.

Brigs, or veſſels with two maſts, have the main-maſt placed about two-thirds of their whole length abaft the head of the ſtem, and the foremaſt three twentieths of the above length. The main-maſt inclines aft at the head, from a perpendicular with the keel, three quarters of an inch in every yard of its length; the foremaſt a full eighth part of an inch in every yard of its length. For cutters, or veſſels with one maſt, the inclination is one inch and a half to every yard in the length, and their bowſprits lie nearly in an horizontal direction.

A BOWSPRIT is a large boom or maſt, cylindrically rounded, except at the outer end, which is ſquare; it runs out over the ſtem, and ſtives or riſes ſo as to make an angle of nearly thirty-ſix degrees above a horizontal line. Its principal uſe is to ſupport the foremaſt by its ſtays, and carry ſail to govern the fore part of the ſhip.

YARDS are long pieces of fir-timber, hanging to the maſts or bowſprits, to expand the ſails.

All ſquare yards hang athwart the maſts at right angles, except ſtuddingſail-yards, which hang parallel under the extremities of the other yards. Lateen yards hang to the maſts obliquely. The yards of a ſhip are all ſquare, except the mizen.

All yards, except lower and topſail yards, are cylindrically rounded, and taper from the middle to the yard-arms; the others are formed eight ſquare in the middle, and from thence to the ends like the fruſtum of a cone.

BOOMS are long poles, run out from different maſts and yards, to expand the feet of particular ſails. Some booms taper from the middle to the ends, like the yards, and others from one third their length to the outer end.

GAFF. A ſhort pole projecting from the mizenmaſt of ſhips, except thoſe of the line, to expand the head of the mizen and driver ſails; and from the main-maſts of brigs and other veſſels, to expand the head of all fore and aft mainſails.

EXPLANATION OF TERMS
USED IN
MAST-MAKING,
ALPHABETICALLY ARRANGED.

ADZE, a ſharp tool to trim ſmooth, after an axe or ſaw.

AFT, the hinder part of the ſhip, or that neareſt the ſtern.

ARM, each end of a bibb.

AUGER, an inſtrument to bore holes with.

AXE, a ſharp tool to trim off rough wood.

AXIS, a real or ſuppoſed line through the centre of a body, about which it may turn.

BATTENS, thin pieces of oak or fir, nailed on to maſt-heads and the midſhip-part of yards.

BAULKS, ſhort fir timber.

BEARDING is diminiſhing any piece from a given line on its ſurface to make the thickneſs leſs on the edge.

BED, the place of the greateſt diameter in bowſprits; and the main piece of barrel-ſcrews, through which the puppets work.

BEES, pieces of elm plank bolted to the outer ends of bowſprits.

BEVELLINGS are angles that differ from right angles, called, by workmen, either under or ſtanding bevellings. By the former is meant an acute, and by the latter an obtuſe, angle. Bevellings are taken by an inſtrument called a bevel, which reſembles a ſquare, only the tongue is moveable, and fixes to the angle required. To transfer it, or ſet it off on the piece, is the ſame operation as by the ſquare.

BIBBS, or brackets, are made of elm plank, and bolted to the hounds of maſts, as ſupporters to the treſtle-trees.

BLOCK, an eight-ſquare or round part below the heeling of main and fore topmaſts.

BLOCKS, ſhells, containing a ſheave or ſheaves.

BLOCKS, ſhort pieces, laid under a maſt, to raiſe it from the ground.

BOARD, timber ſawed to a leſs thickneſs than plank, as one inch and under.

BOLSTER, a ſort of pillow made of fir, faſtened on each ſide the maſt-head, to prevent the ſhrouds chafing againſt the treſtle-trees.

BOLTS, cylindrical pins of iron. The commoneſt have ſmall round heads, and are uſed to unite two or more pieces together. Some have round flat heads, called ſaucer-heads, with a mortiſe in the other end, or point, and are uſed to faſten moveable pieces to fixed ones; others have an eye at one end, for laſhing or hooking blocks, &c. and are driven in maſt-heads, yards, caps, &c. Some have a ſquare part left at the back of the eye, that they may not be driven on the eye, and endanger ſplitting.

BOOM-IRONS are rings faſtened to the quarters and extremities of yards, for the ſtuddingſail booms to ſlide through.

BOW, the rounding part of a ſhip's ſide forward.

BRAIL, a rope uſed to haul up the ſail.

BUTT, the lower part next the root of a tree, alſo the lower ends of any part of made-maſts, and the ends of coaks, tablings, haunches, &c.

CALLIPERS are compaſſes with circular legs.

CANTING, a term denoting the act of turning any thing over from its former poſition.

CANT-PIECES are uſed in the angles of the fiſhes and ſide-trees, or to ſupply any part that may prove ſappy or rotten.

CAP, a thick block of elm timber, with two holes perpendicularly to its length and breadth, and parallel to its thickneſs, (the foremoſt hole being round and the after one ſquare,) uſed to confine two maſts together, when one is erected at the head of the other to lengthen it.

CARLINGS, pieces of oak timber, about eight feet long and eight inches ſquare, or more, uſed for framing the partners.

CHAMFERING, taking off angles or edges.

CHEEKS are projecting parts on each ſide the maſt, to ſuſtain the frame of the top and topmaſt.

CHEEKS, head of the, that part above the ſtops.

CHINSE, to thruſt oakum into the ſeams, with a ſmall iron inſtrument.

CHOCKS, pieces made to faſhion out ſome part wanting, or to place between the head of a lower maſt and heel of a topmaſt.

CLEATS, pieces of plank or board of various ſhapes, for different purpoſes. Thoſe uſed for ſtopping of ſhores are moſtly made of Elm, ſimilar to wedges, but only taper from one ſide: thoſe for ſtopping of rigging are haunched on the back with a hollow, from one third the length; the thin end is ſhaped with a duck's-bill; theſe are made of oak, but, for maſt heads, of elm.

CLEATS, COMB, are ſtraight on the inner edge, and round on the back, with a hollow cavity in the middle.

CLEATS, SHROUD, one part is ſhaped like a belaying-cleat, with two arms, the other part ſtraight, and grooved on the edge to the convexity of the ſhroud, to which it is ſeized, having a ſcore cut towards its extremities for the ſeizing to lie in.

CLEATS, SLING, of lower yards, are made with one arm; belaying-cleats with two, one on each ſide the middle. Thumb-cleats are ſimilar to ſling-cleats, but ſmaller, to hang any thing thereon.

CLEATS are nailed wherever wanted, with more or leſs nails, according to the ſtrain they reſiſt.

CLENCHING. Making faſt the point of a bolt or nail on a ring or rove of iron, by battering the point and making it ſpread.

COAKS are oblong ridges left on the ſurface of different pieces of made-maſts by cutting away the wood round them; the intermediate part is called the plain.

COAKING is uniting two or more pieces together, in the middle, by ſmall tabular pieces, formed from the ſolid of one piece and ſunk exactly the ſame in the other, the butts of which prevent the pieces drawing aſunder lengthways.

There are different methods of coaking, as follow. Coak and plain is when a coak is formed, and a plain ſurface follows between that and the next. Running coaks are coaks continued the whole length along the middle, but anſwer the above purpoſe, as the butts of each coak come one third their breadth within and without each other alternately.

Chain-coaks are formed one at the end of the other on the oppoſite ſides of the middle-line. See Tabling.

COAT, pieces of canvas tarred to put round the mafts at the partners.

CROSS-TREES, pieces of oak timber athwart the upper ends of the lower mafts, let in and bolted to the treftle-trees.

DEALS are of fimilar thicknefs to plank, but the term is confined to fir.

DOULING. A method of coaking, by letting pieces into the folid; or uniting two pieces together with tenons.

DRAWING-KNIFE. A long narrow edge-tool, with a handle in each end.

DRIFT means the difference between the fize of a bolt and the hole into which it is to be driven; as, if a bolt be 1-8th of an inch larger than the hole, the bolt is faid to have 1-8th drift. And fo of a hoop which is to be driven on a maft.

DUBBING, reducing or taking wood away with an adze.

ELM, wood of fingular ufe when continually expofed either to wet or dry; its grain being tough and curly makes it not liable to fplit. If felled between November and February it has no fap. It is ufed in maft-making for caps, bibbs, bees, and part of tops.

FACING, letting one piece into another with a rabbet.

FAYING, the joining of one piece to another, that the leaft opening may not appear; it is performed by moulds, bevellings, or by laying one piece on the other, and fetting them as clofe together as poffible; then with compaffes take the diftance they may be afunder, and let that diftance, or fpoiling, be fet off from the furface or edge of the faireft piece on to the fides of the other, at as many places as may be neceffary for lineing. If the pieces coak or table together, the thicknefs of the coaks or tablings muft be added to the former gage or fpoiling.

FERRULE, a fmall iron hoop, fixed on the extremities of the yards, booms, &c.

FILLINGS, pieces ufed to make a fair curve for the wooldings, between the edges of the front-fifh and fides of the maft.

FID, a fquare bar of iron or wood, ufed to fupport the weight of the topmaft, &c. when erected at the head of the ftanding maft.

FIR, in maftmaking, is the moft ufeful wood for length, fize, and lightnefs. It forms the body of the maft, the fpindle, fide-trees, fifhes, cheeks, fillings, and cant-pieces. Mafts are alfo frequently made of fingle trees, as are yards, booms, topmafts, &c.

Fir-trees of Riga and Gottenburgh exceed in ftrength about one tenth thofe of Norway, and one fixth thofe of New England: and fir-trees of Scotland exceed in ftrength thofe of Norway.

Though the Riga and Gottenburgh trees exceed thofe of New-England in ftrength, the latter have the advantage in fize; as a large maft may be made of a fingle tree: but mafts made of Gottenburgh, Riga, or Norway, trees, are compofed of the moft fubftantial parts of feveral.

The value of fir-trees and timber fluctuates; but annexed is a table of the prices given in 1792.

FISHES, SIDE, two long pieces of fir, coaked on the oppofite fides of a made-maft to give it the diameter required.

FISH, FRONT, or paunch, a long piece of fir, hollowed on the infide to the convexity of the maft, and rounded on the back. It faftens to the forefide of lower mafts in the middle, and adds fecurity and ftrength. Fifhes are alfo ufed in the middle of mafts, yards, bowfprits, &c. fprung or damaged at fea.

FLAG-STAFFS are light poles, formed by, or erected on, mast-heads; alſo at the heads and ſterns, on which flags are hoiſted.

FLOORS, the loweſt timbers in a ſhip.

FORE AND AFT, from ſtem to ſtern, or in that direction.

FORELOCKS, ſmall flat wedges of iron, pointed at one end, to drive through mortiſes in the ends of bolts, to retain their fixed poſition, and prevent their drawing.

FORELOCKS, SPRING, have heads, and are ſhouldered underneath, to prevent their going through the mortiſes; they alſo have thin tongues at the points, as ſprings, to keep them from coming out: theſe are uſed to bolts that often require ſhifting.

FORWARD, the foremoſt part of the ſhip, or that neareſt the head.

GAGE, a meaſurement taken by a rule or compaſſes.

GAMMONING, a rope that binds the inner quarter of the bowſprit cloſe down upon the ſtern.

GIRTH, the circumference.

GUNWALE, a board of elm, nailed to the upper ſides of the timbers, at the aft part of a top. The upper flat planks on the ſides of a veſſel are likewiſe called the gunwale.

HALIARDS, ropes to hoiſt or lower the gaff, &c.

HAUNCH, a ſudden decreaſe in ſize.

HEAD OF THE MAST is the upper part of the maſt from the ſtop of the cheeks.

HEEL, the lower end of a maſt; the ſame as butt.

HEELING, the ſquare part left at the lower end of a topmaſt and topgallant maſt.

HEWING, trimming off the rough from timber, &c. with an axe.

HOOK-BUTT, is the ſurface raiſed acroſs higher in one place than another.

HOOPS are ſtrong circles of iron driven on maſts and yards.

HOOPS, CLASP, have a hinge in the middle, and faſten together with forelocks through mortiſes made in the ends.

HOOPS, MOULD, thoſe that deviate from a circle.

HORSE, a thick iron rod, faſtened at the ends to the inſide of the ſtern of veſſels that carry a fore and aft mainſail, for the main ſheet to travel on; and alſo acroſs the deck before the maſt, for the ſheet of a foreſail.

HOUNDS, the place next under the head of a maſt, where it is made more ſubſtantial for ſupporting the treſtle-trees and top.

JAWS, or HORNS, to the inner ends of gaffs and booms, are ſemi-circular, to confine them to the maſt by embracing half its circumference.

JURY-MASTS, maſts uſed inſtead of the proper ones, in caſes of neceſſity or otherwiſe.

KEEL, the loweſt part of a ſhip, formed by ſquare timbers ſcarfed together endways.

KEELSON, ſquare pieces of timber fayed to the upper part of the floors over the keel.

LAP, to cover one piece with part of another.

LARBOARD SIDE, when looking forward from the ſtern, is the left ſide.

LEATHERING, prepared leather, dreſſed cloſe round the circular holes of caps, and the ſweep of jaws belonging to booms and gaffs, nailed on the upper and under ſides.

LINEING, is marking the length, breadth, or depth, of any thing, according to deſign, by a cord, rubbed with white or red chalk, faſtened at the extremities, and forcibly pulled up in the middle, or towards one end, then let fall perpendicularly, if meant to be ſtraight, or thrown ſideways to form a curve. To perform the latter with exactneſs requires practice.

MALL, an iron tool to drive bolts with, &c.

MALLET, a wooden tool, to drive with.

MIDSHIPS, when ſpeaking with regard to the breadth of the veſſel, is a ſuppoſed line from the ſtem to the ſtern-poſt; but, with regard to the length of the veſſel, the broadeſt part is called the midſhips, although that is not the middle of its length.

MOULDS are made of board to the ſhape of ſome deſign; or to the ſhape of ſuch pieces as are wanted for making good deficiencies; others for making of hoops are made to the ſhape and ſize of the maſt, and nailed together at the corners.

MOULDED, ſignifies breadth; or the ſides of a piece ſhaped by a mould.

MOUSING, ſeveral turns, with a ſtrand, taken round the back of a hook and through an eye in the point, to prevent its unhooking.

NAILS, DUMP, are round, and have long flat points.

NECK, the arms that ſupport the boom-ring are called the neck of the outer boom-iron.

NOCK-EARING, the rope that faſtens the nock of the ſail.

NUTS, ſmall ſquare pieces of iron, with a ſcrew-hole cut in the middle.

OAK, the moſt uſeful timber for ſtrength and durability, when expoſed to the weather. It is uſed, in maſtmaking, for treſtle-trees, croſs-trees, and open tops.

OAKUM, old rope untwiſted and picked ſmall.

OUT OF WINDING. See Winding.

OVOLO, a moulding conſiſting of a round and hollow.

OUTHAULER, a rope that hauls out the tack of the jib, &c.

PARTNERS, the place where the deck interſects the maſt, which is there made more ſubſtantial for wedging the ſame. But, in maſtmaking, it more generally implies the place of the middle-deck, in three-deck ſhips, and the place of the upper-deck, in two-deck ſhips; and at that place the given diameter in the Table of Dimenſions is applied. Maſts with hoops are made one inch larger than the given diameter, two feet each way of the partners, to give the hoops a quicker drift.

All maſts are to keep the ſame ſize as the given diameter at each deck.

PIECES, heel, head, or hound, are ſhort pieces to make good ſome deficiency.

PLAIN, an even ſurface between the coaks.

PLANE, a tool to make ſmooth with.

PLANK, broad timber, from four inches to one inch thick.

PLUMB, perpendicular.

PLUMB-LINE, a line ſuſpending a lump of lead, which keeps it ſtraight and perpendicular: by it is taken, at the ſides of maſts, &c. the diametrical dimenſions, to correſpond with the line or lines ſtruck

on the ſurface of the upper ſide, to which it is ſawed. When maſts are not ſawed, the ſides are hewed in, at different places, about four feet aſunder, until the plumb-line anſwers with the line ſtruck on the ſurface; and the rough wood between theſe diviſions is hewed off, to agree with the plumb-line. A maſt, or piece to be plumbed, ſhould be placed in ſuch a manner as, when hewed in its direction, may gain the greateſt ſubſtance clear of ſap or rot.

PUPPETS, two upright pieces, with a ſcrew cut in the lower ends.

QUARTERS, a term given to ſome of the diviſions on a maſt, yard, &c. where the different diameters are ſet off, for lineing, or marking.

RABBET, a ſmall ſquare channel cut in the edge of one piece to let in another. The depth of the rabbet to be equal to the thickneſs let in.

RACE, to mark, by the edges of moulds, with a racing knife or points of compaſſes, upon timber, &c.

RACING-KNIFE, a ſmall tool to race with.

RAILS are made of wood or iron, and fitted acroſs the aftſide of tops, to prevent the men from falling.

RAKE, the inclination of the maſts from a perpendicular with the keel.

RAM-LINE, a long line, (thicker than common) uſed to gain a ſtraight middle-line upon a tree or maſt. It is made faſt at one end, and hauled upon at the other till it is quite ſtraight, and then made faſt.

RIM, a ſkirting of narrow elm board round the upperſide of tops.

RIND-GALL, a damage the tree received when young, ſo that the bark or rind grows in the inner ſubſtance of the tree.

RING, a ſmall circle of iron, uſed to put over the point of a bolt, between the wood and the forelock, to prevent its chafing or cutting the wood.

ROLLERS, are ſimilar to ſheaves, but longer.

ROUNDING. In large maſts, the ſixteen ſquare is divided into four parts, and lined, and thoſe angles dubbed off. Smaller maſts, yards, &c. have the angles of the ſixteen-ſquare taken off with a drawing-knife, and then are rounded fair and ſmooth with planes.

ROVE, a ſmall ſquare piece of iron, with a hole in the middle, whereon is clenched the point of a nail, to prevent its drawing.

SADDLES, ſemi-circular pieces of wood, ſhaped and faſtened to the upper ſide of the bowſprit.

SAUCER, a bolt with a flat head.

SCANTLING, the thickneſs or depth of a piece of timber.

SCARFED, the end of one piece of timber lapped over or let into another, to appear a ſolid and even ſurface.

SCORE, a notch cut out of any piece of wood, to admit another projecting in a ſimilar ſhape.

SCREWS, bed or barrel, for raiſing the heads of large maſts and fixing the treſtle-trees, are made of elm, and conſiſt of two puppets, a bed, and a ſole: the puppets are four feet nine inches long, have their lower parts round like a cylinder, and are cut with a ſcrew; their upper part, or head, is larger, and is either eight-ſquare or round, with iron hoops driven on, to prevent their ſplitting; through theſe heads are holes, on the different ſides, through which long iron pins are thruſt; which put them in mo-

tion by preffing againft them, and acting as levers. The bed is a broad thick piece of elm, three times the diameter of the fcrew in breadth, once the diameter of the fcrew in thicknefs, and about fix feet in length; with a hole at each end of the bed, for the fcrews or puppets to work in. Six bolts are driven through the bed, and clenched on a ring to prevent its fplitting; two are in the middle, and two at each end. In the fides and ends, mortifes are cut for hand-holes. The fole is the fame breadth and length as the bed, and half the thicknefs, with a hole hollowed out at each end for the puppets to work in. Sometimes the fole is thicker, and, inftead of holes, has an iron plate, with a hole let into each end, wherein works an iron fprig, that is driven into the heel of the puppet with a fhoulder.

SCREWS, hand, a box of elm containing cogged iron wheels, of increafing powers. The outer one, which moves the reft, is put in motion by a winch on the outfide, and is called either fingle or double, according to its increafing force. It is fometimes falfely called a jack.

SCUTTLE, a fquare hole cut through a floor, and furnifhed with a lid or covering.

SEAMS, the openings (in which oakum is driven) between the pieces that compofe made-mafts, yards, &c.

SET-OFF, a term ufed for marking down the diftance of any dimenfion or fpoiling from a given place.

SETTS, powers made ufe of, where force is required, to bring or unite two or more pieces together. It is performed by fcrews, fhores, crofs-fetts, or cleats.

SETTS, crofs, are made by two fhort pieces of fpar, about four or fix feet in length; one is laid acrofs on the upper fide, and the other on the under fide, of any two pieces that are to be brought together, and their ends lafhed together on each fide with feveral turns of rope, taken round each end alternately; wedges are then driven in between the upper crofs-piece, and the fide or part of the maft.

SHEAVES, folid cylindrical wheels, fixed in mortifes, cut in the mafts, yards, booms, caps, or blocks, and moveable about a pin or bolt as an axis.

SHEER-HULK, which is ufed in the royal navy for mafting of veffels, is an old fhip of war, cut down to the gun or lower deck, with a maft fixed in midfhips, about 33 inches diameter, and 108 feet high, ftrengthened with fhores; the upper fhore 87 and the lower fhore 81 feet long, and each 19 inches diameter. There are fhrouds and ftays to fecure the maft and fheers, which act as the arm of a crane, (fupported by a derrick, 100 feet long and 22 inches diameter,) to hoift in or out the lower mafts, when conveniently laid alongfide.

There are three fheers, each compofed of two pieces, 22 inches diameter, fcarfed together in the middle, to make 116 feet in heighth. The heels reft upon the fides of the hulk, and the heads incline outwards from a perpendicular, to hang over the veffel whofe mafts are to be fixed or difplaced. This is performed by large tackles, extending from the head of the maft to the head of the fheers. The tackles by means of two capftans are fixed on the deck.

SHEERS, ufed for mafting veffels in the merchant fervice, are two hand-mafts or large fpars, erected on the veffel whofe mafts are to be fixed or difplaced; the lower ends or heels reft, on oppofite fides of the deck, upon thick planks fufficiently long to extend over two or three beams fhored underneath. The two handmafts crofs each other at the upper end, and are fecurely lafhed. A tackle is lafhed in the centre, and hangs perpendicularly over the ftation where the maft is to be fixed.

The fheers are fecured by guys, or ftays, of proportionable rope, extending fore and aft to the oppofite extremities of the veffel.

SHEET, main, a tackle by which the boom of a fore and aft mainfail is fhifted from each quarter.

SHORES are made of ſmall ſpars, cut to ſuitable lengths, that their heels may reſt againſt a cleat, nailed on the maſt or floor, or againſt a ſtump driven in the ground, or any thing of greater reſiſtance than the force required: The ſett is made by driving wedges between the head or heel of the ſhore.

SHROUDS, large ropes that ſupport the maſts.

SIDED, the dimenſions of any piece contrary to which it is moulded.

SIDE-TREES, the lower main pieces of a made-maſt.

SLIDING-RULE, a flat uſeful inſtrument, one foot long, with a ſlide, on which various dimenſions and proportions are marked.

SLINGS, the middle, or that part of a yard attached to the maſt.

SNAPING, reducing the ends of any piece to a leſs ſubſtance.

SPARS, ſmall fir-trees.

SPOILING is taking the greateſt diſtance of the inequalities between any two pieces to be fayed together.

SPINDLE, the upper main piece of a made-maſt.

SPRIG, a ſmall eye-bolt, ragged at the point.

SQUARE, an iron or wooden inſtrument, with a perpendicular and baſe, uſed as a guide to ſet-off by.

SQUARING is making one or more ſides from the plumbed ſides, which may be performed by a plumb or ſquare, the tongue of which is a perpendicular to its ſtock or baſe.

The maſt or piece is firſt lined or marked to its ſize on one of the ſides already plumbed, and ſo fixed that the ſides, when plumbed, ſhall be ſquare to the upper ſide. If by the latter, the ſtock is reſted on the given ſide, and the line thereon tranſmitted by compaſſes to the under ſide from the inſide of the tongue, and this repeated at the quarters, and where neceſſary, for lineing. Pieces that are ſtraight need only a ſpot ſquared down at each end. Obſerve, the under ſide of the ſtock of the ſquare ſhould be kept out of winding from one particular place; ſuppoſing that place to be near the middle, a batten with a ſtraight edge muſt be laid acroſs, and there kept fixed againſt the ſide of the maſt or piece, to which the under ſide of the ſquare muſt agree, by ſeeing the two edges parallel with each other. The ſame may be performed by two battens. Let one ſquare ſpot be hewed, to which one batten muſt be held, and the other batten looked out of winding at ſuch diſtances as are neceſſary; and, when the edges of two battens agree, take, with compaſſes, what the line on the ſurface is within the edge of the ſquare, or batten, and in the ſame direction ſet that gage within the edge of the batten or ſquare on the oppoſite or under ſide, and a line is then ſtruck to range through theſe ſpots. The more curve there is, the greater number of ſpots are neceſſary.

An eight-ſquare is formed by reducing a four-ſquare nearer to a round, by taking off the angles, which are lined or marked within the edge, or from the middle line on each ſide. If the former, 7-24ths of the diameter is ſet within the edge at as many places as may be neceſſary for lineing: or 5-24ths the diameter on each ſide the middle line, for the latter, and a line ſtruck to range fair through thoſe ſpots; and the angles dubbed or ſawed away to thoſe lines.

The rule proper for maſtmakers has the diviſions for the eight-ſquare ſtamped on the edges, from 1 to 36 inches, or more: thoſe on one edge are marked M. for middle line, and on the other edge E. for thoſe ſet within the edge. It is neceſſary to have both theſe diviſions, in caſe the maſt or piece will not work ſquare enough to gain the ſquares or angles.

A ſixteen-ſquare is made by reducing a maſt, or any other piece, nearer to a round, by taking the angles off the eight-ſquare, in the following manner: viz. divide the eight-ſquare into four equal parts,

and ſtrike a line to range through the diviſions next the edges or angles, which are dubbed off to thoſe lines, ſimilar to the former.

STAFFS, ſhort pieces by which the ſetts are made; alſo long narrow pieces, with diviſions of ten or twenty feet marked thereon, and again divided into halves. They are uſed to ſet-off long lengths.

STANTIONS, ſmall pillars of wood to ſupport the top-rail.

STARBOARD-SIDE, when looking forward from the ſtern, is the right-ſide.

STAYS, large ropes to ſupport the maſts.

STEM, the curved timber which terminates the ſhip forward.

STEP, large ſolid pieces of oak timber, fixed acroſs the keelſon, into which the heels of the maſts are fixed by the tenon.

STERN is the after or hindmoſt part of a veſſel, above the ſtern-poſt.

STERN-POST, the large piece of timber which terminates the veſſel below the ſtern.

STIVING, a term uſed for elevating any thing ſo as to make an angle with the horizon.

STOPPERS are ropes the ſize of the ſhrouds, two feet in length, with a knot and lanyard to each end.

STOPS, ſquare projections or ſhoulders, left on the outſides of the cheeks, at the upper part of the hounds of lower maſts; alſo on topmaſts and topgallant maſts; and at the outer end of jib-booms.

STRIKE, to draw a line or delineate a circle.

TABLING is the uniting of pieces together in a manner ſimilar to the chain-coak, but broader, and comes quite to or very near the edge, from the line in the middle.

TAR, a liquid gum, diſtilled from pines or other fir-trees, and prepared for uſe by boiling, &c.

TACKLE, a machine formed by two blocks connected by a rope.

TEAK, a hard and durable Aſiatic wood, uſed abroad for maſts and hound-pieces for topmaſts.

TENON, the end of a maſt, bowſprit, &c. cut ſmaller to fit into a mortiſe.

'THWARTSHIPS, acroſs the ſhip at angles with the keel's length.

TIMBERS, a name given to thoſe croſs-pieces to which the platforms of cloſe tops are faſtened.

TOGGLE, a ſmall wooden pin.

TONGUE, the taper part at the lower end of a ſpindle, or of a ſcarf.

TOP, a platform projecting round the lower-maſt head: its principal uſe is to extend the topmaſt ſhrouds by a greater angle, and give additional ſupport. In the ſides of the top are ſquare mortiſe holes for the futtock-plates to go through, with dead eyes bound in their upper parts, to unite the topmaſt ſhrouds with thoſe of the lower maſt.

The top is extremely convenient for extending and managing the ſmall ſails, and fixing or repairing the rigging.

Tops of ſhips of war are, for defence againſt ſwivels, muſquetry, &c. barricadoed, with a thick fence of corded hammocks, from the foremoſt topmaſt-ſhroud round aft along the rail, breaſt high. The rail is ſupported by ſtantions let into the top, with a netting from ſide to ſide; the outſide is covered with baize or canvas, and furniſhed with ſtoppers, to clap on in caſe a topmaſt ſhroud ſhould be carried away by accident.

The frame of the top is either of deals, laid cloſe together, and nailed to elm timbers, or open, like a grating, and made of oak battens. The former is ſtrongeſt and moſt convenient, and is adopted by government; the latter is lighter and cheaper, holds leſs wind, is conſequently leſs expoſed to its effects, and is uſed in the merchant-ſervice.

THE TOP-ROPE paſſes through a block, hooked in an eye-bolt on one ſide the lower cap, and afterwards through a hole, with a ſheave or pully, at the lower end of the topmaſt; it is then brought upwards on the other ſide of the maſt, and made faſt to an eye-bolt in the cap oppoſite the former. At the lower end of the top-rope is a top-tackle, by which the topmaſt is hoiſted parallel to the lower-maſt.

TOP-ROPE, JIB, a rope by which the jib-boom is hoiſted out.

TREES, ROUGH, thoſe which are cut down, and only the boughs lopped off.

TRESTLE-TREES, two ſtrong bars of oak timber reſting on the cheeks of lower-maſts, or hounds of topmaſts. To lower-maſts they are ſecured by being ſcored and bolted horizontally on the oppoſitẽ ſides of the maſt, fore and aft, and ſupported by two bibs or brackets, as ſhoulders under them. Topmaſt treſtle-trees are ſupported by the hounds.

TRIMMING, working any piece into the form and ſhape deſigned by an axe or adze.

TRUCK, an oblate ſpheroid, made of elm, and fitted on maſt-heads.

WEDGES are made of beech or oak to any ſize required, and taper on each ſide from the butt or head. There are fir wedges made large enough to confine the maſt in the partners of the decks.

WINDING. When the edge or ſide of a piece of timber or plank is not a direct plain, but twiſts, it is ſaid to wind; if the contrary, out of winding.

WOOLDING, ſeveral cloſe turns of rope, ſtrained tight round a maſt, yard, or bowſprit.

YARD-ARM, the outer quarter of a yard.

THE

PRACTICE OF MASTMAKING.

THE FIVE PLATES OF MASTS WILL, UPON REFERENCE, BE FOUND MOST CLEARLY TO ELUCIDATE THIS TREATISE ON MASTMAKING.

MASTS are compofed of many united pieces of the foundeft part of trees, and are ftronger than when made of a fingle tree, and lefs liable to fpring.

The prefent practice of putting together made-mafts is by a fpindle, or upper tree, two fide-trees, with their heel-pieces, fide fifhes, cheeks, front fifh, cant-pieces, and fillings.

The fpindle, or upper tree, of large mafts is made of two pieces (the fubftantial part of two leffer trees) coaked one into the other in the middle, and bolted together with bolts five feet afunder, and it tapers toward the upper and lower ends. The fpindle of fome mafts is made of a fingle tree.

The fide-trees of large mafts are made of two pieces, as above, coaked one into the other in the middle, and bolted together with bolts ten feet afunder. Side trees of fmaller mafts are made from one tree; and, after they are fo made, are coaked into the lower taper or tongue of the fpindle, and below that into each other, and bolted through all with bolts five feet afunder.

The heel-pieces are fhort pieces, fcarfed on the lower part of the fide-trees, to make good their deficient length. They are often worked fhort, to gain fubftance in the middle.

The fide fifhes are long planks of fir, let in and coaked into the flat furface made by the fide-trees and fpindle, of fufficient thicknefs to gain the diameter required fore and aft.

The diameter athwartfhips is gained by the fide-trees and fpindle.

The maft, thus far completed, is rounded, and fecured by ftrong iron hoops driven on the outfide.

The cheeks are large pieces of fir (formerly oak) coaked or tabled into the upper taper or tongue of the fpindle, and fufficiently thick to fafhion out the head of the maft, and leave a ftop for the fupport of the treftle-trees: they are bolted together and fecured by ftrong iron hoops on the fquare part or head.

The front-fifh, or paunch, is a long plank of fir, hollowed to the convexity of the maft, and faftened on the forefide of the maft over the iron hoops.

The cant pieces and fillings are various pieces of fir: the former make good the angles occafioned by the fide-trees and fide-fifhes, and the latter form a fair round with the fide of the maft and the upper part of the front-fifh, for the conveniency of woolding. The whole is then ftrongly woolded together, between every hoop, with thirteen clofe turns of rope, each turn fecured by woolding-nails, with leather under their heads to prevent their cutting.

Mafts of lefs diameter than the former are conftructed of two trees, called the upper and lower tree, which are fcarfed and coaked together in the middle; the upper part forming the tongue for the reception of the cheeks; the lower tree, with the addition of a heel-piece to make good the length of the upper tree, gives the diameter the fore and aft way; then, with the addition of two fide-fifhes, the maft is completed for hooping, and the cheeks are then let on.

In fitting maſts particular attention ſhould be paid to place the rounding ſides of curved or crooked maſts forward.

Bowſprits of large ſhips are made ſimilar to the above; but when made of a ſingle tree, not ſufficiently large to obtain the diameter required, it is common to make good ſuch deficiency by a fiſh or paunch of fir, extending the whole length, and run coaked and fayed cloſe to a ſurface made on the upper ſide for that purpoſe, nailed faſt to the ſame, and ſecured by wooldings as the maſts are. This method of ſtrengthening maſts, bowſprits, &c. is commonly uſed at ſea, when ſprung or otherwiſe weakened, by fiſhes made of fir, oak, plank, anchor-ſtocks, or ſuch materials as can be had.

METHOD OF CONVERTING AND LINEING OR MARKING TREES, TO BE SAWED OR HEWED, FOR PUTTING TOGETHER AND COMPLETING MADE-MASTS, MASTS OF SINGLE TREES, BOWSPRITS, YARDS, &c.

THE converſion of trees or timber to the beſt advantage is of great importance, otherwiſe much unneceſſary expence and waſte muſt occur; and the greater number of pieces any maſt is compoſed of the more judgement is required to ſuit each piece with a tree the neareſt to its ſize. The moſt approved method is, to delineate the various pieces the maſt is to be compoſed of by a convenient ſcale of any part of an inch to a foot, upon a ſmooth board or paper, that the different lengths and thickneſſes may be taken, ſo that the moſt ſuitable trees may be provided.

Trees not quite ſtraight, if ſufficiently large, may be uſed; the workmen having always an opportunity of ſetting them ſtraight, when required.

Every tree appointed to make a maſt, yard, bowſprit, or any part thereof, ſhould be examined whether ſound and fit; for which purpoſe a ſhort piece is cut off the butt, or largeſt end, to ſee whether the heart of the tree is ſound. If it has white pithy veins, is rotten, or ſhaky at the heart, it is bad: if ſo, continue taking off more pieces while there remains ſufficient length. When the butt is approved of, ſearch along the ſides, by dubbing or hewing ſpots a little diſtance aſunder, and carefully examine every knot, rindgall, &c. If found and clear of ſap, line and meaſure it to the thickneſs and length intended.

Trees for ſpindles of made-maſts line in length five-ſevenths the length of the whole maſt: ſide them fore and aft two-thirds the whole diameter of the maſt, if the trees will admit; if not, three fifths the diameter of the maſt, and ſo continued to the haunch of the ſide-fiſhes; and above the butt of the ſide-fiſhes to the ſize of the maſt-head. The thickneſs of the coaks to be allowed, when ſpindles are compoſed of two trees.

The ſize of the ſpindle athwartſhips is ſet off tapering from a middle line to half the given diameter at the ſtop of the hounds, and is to haunch in, three inches on each ſide, four feet below the butt of the ſide-trees; and from thence lines ſtraight to half the given diameter at the ſecond quarter, and then tapers to half the ſize of the ſtop at the butt. Above the butt of the ſide-trees the upper part tapers to five-thirtieths of the given diameter at the head. The thickneſs of the coaks for faying is to be added.

SIDE-TREES are ſided to the ſize of the ſpindle, the fore and aft way, and the thickneſs of the coaks added when a ſide-tree is compoſed of two pieces.

The breadth athwartſhips, from the heel of the maſt to the butt of the ſpindle, is one-half the diameter, adding the thickneſs of the coaks. It is the ſame from thence to the ſecond quarter, deducting the ſubſtance of the ſpindle. At the third quarter (ſpindle included) the breadth is eighteen twenty-fifths of the given diameter, and at the haunch one-fourth of the breadth of the ſpindle at the ſtop of the hounds.

Trees not of fubftance to admit the fide-trees working their whole length are made good with heel-pieces, fcarfed underneath at their lower ends. The fcarf lines in length one-third, or one-half the length of the heel-piece, with a butt at the upper end one-fixth the depth, and at the lower end three-fevenths the fubftance of the fide-tree, and a hook-butt in the middle of one inch or more.

SIDE-FISHES are commonly fawed out of one tree, down the middle, and one-fourth the diameter of the maft fet off on each fide for the thicknefs: the breadth two-thirds the given diameter, and forty forty-one parts of that breadth at the firft quarter; eleven-twelfths at the fecond, five-fixths at the third, and two-thirds at the upper end, and a parallel breadth from the gun deck to the butt.

FRONT-FISH, the fame as the fide-fifhes.

CHEEKS line in length, for the main-maft, nine-twentieths; for the fore-maft three-fevenths; and for the mizen-maft two-fifths, the length of their mafts: they line ftraight on the infide from the upper part, and are fet back five inches for every yard in the length of the maft, except the mizen-maft; in that only four inches for the length of the head and ftop of the hounds, and feven-fifteenths that length for the length of the hounds. Breadth of the cheeks at the head, two-thirds the given diameter of the maft, and three-fourths at the ftop and lower part of the hounds. In the middle, between the hounds and the lower end, eleven-twelfths of the breadth at the ftop, and at the lower end half the given diameter. Allow the thicknefs of the coaks, when made of two pieces. The thicknefs of the cheeks is fet off from the infide. The upper part above the ftop to be one one-fourth the given diameter, and a ftop left to project full half that thicknefs; the lower part of the hounds one inch more than the thicknefs of the upper part, or head. From thence line ftraight to five-ninths of the head at the lower end.

HEEL-PIECES are fided to the fame fize as the fide-trees, and are fawed with a fcarf, to fit that left in the fide-tree.

MASTS MADE OF TWO TREES.

Both trees line the whole length of the maft, when fufficient; if not, the deficiency is made good by a piece at the head and heel. Both trees are fided athwartfhips to two-thirds the diameter of the maft, from the heel to the haunch of the fide-fifhes, and taper above the butt of the fide-fifhes to one-half the given diameter at the ftop of the hounds, and five-thirtieths at the upper part of the head, adding to the latter the thicknefs of the coaks on each fide for faying the cheeks.

Each tree lines ftraight on the infide, and the diameter of the maft fore and aft is made by the lower tree, holding the greater fubftance at the heel, and the upper tree on the head, and both one fubftance at the fecond quarter: the thicknefs of the coaks to be added.

Fifhes and cheeks the fame as for mafts made with fpindle and fide-trees.

MASTS MADE OF A SINGLE TREE.

LOWER MAST. The tree intended for this purpofe has a ftraight line ftruck along the middle, and the heighths of the decks fet up thereon from the butt. The middle deck, in three deck fhips, and the upper deck, in two deck fhips, are the partners; then from the heel fet up the whole length of the maft, and from that length fet back five inches in every yard for the head and ftop for the hounds, and four inches only in the mizen-maft, and feven-fifteenths that length for the length of the hounds. Then divide the fpace from the lower part of the head to the partners into four equal parts, and term them quarters; that neareft the partners the firft, the next the fecond, the other the third. Large mafts have two quarters between the lower deck and heel.

The different diameters of the lower mafts are fet off at thofe places by plumbing down one-half on each fide from the line in the middle, beginning at the partners with the given diameter in the Table of Dimen-

fions, (and many add one inch more, to give the hoops a quicker drift.) At the other decks, the fame as the given diameter; at the firft quarter fixty fixty-one parts of the given diameter; at the fecond fourteen-fifteenth parts; at the third fix-fevenths; at the lower part of the head three-fourths; and at the upper part five-eighths. Leave a ftop of four inches and a half, or three inches and a half, according to the fize of the maft, at the lower part of the head on each fide athwartfhips. The diameter of the firft quarter, below the lower deck, to be the fame as the firft quarter above the partners; the next the fame as the fecond, and at the heel to be fix-fevenths of the given diameter.

Mafts that have cheeks differ in this; they line tapering athwartfhips, from the lower end of the cheeks to five-thirtieths the given diameter at the head, adding the thicknefs of the coaks for faying the cheeks.

Cheeks and front-fifh the fame as for mafts made with fpindle and fide trees.

Cutters and other fmall veffels have their lower-mafts and top-mafts all in one; and the topmaft above the ftops of the lower-maft one-third or one-fourth the whole length; with hounds, ftops, and a fquare head above, fimilar to fhips' top-mafts: fometimes they have a common head, like other lower-mafts, with crofs-trees, cap, and top-maft, as fancy dictates. The diameters are fet off as for other mafts.

TOP-MASTS. The tree has a line ftruck ftraight along the middle; and from the butt once and a half the given diameter is fet up for a block below the heeling, which is twice and a half the diameter from the block; then from the lower part of the heeling fet up the place of the lower cap, which is the length of the lower-maft head, alfo the whole length of the top-maft; and from that length fet back, for the length of the head and ftop of the hounds, four inches to every yard for the main and fore top-mafts, and three inches and a half for mizen top-mafts, and three-fifths that length below for the length of the hounds; and divide from the lower part of the head to the cap into four equal parts or quarters; that next the cap is the firft quarter. At thefe places the different diameters are fet off as before. At the cap the diameter as in Table of Dimenfions; at the firft quarter fixty fixty-one parts the diameter of the cap; at the fecond quarter fourteen-fifteenths; at the third quarter fix-fevenths; at the lower part of the hounds thirteen-fixteenths; at the ftop nine-tenths; at the lower part of the head nine-thirteenths; and at the upper part fix-elevenths.

The ftops on the fore and aft fides are to come up to the underfide of the crofs-trees.

The heeling to be fquare, and large enough (if the tree will admit) to fill up the treftle-trees at the lower-maft head, and to haunch at the upper part to the diameter of the cap.

The block below the heeling the fame diameter as at the cap.

The aftfides of top-mafts line ftraight.

MIZEN TOP-MAST. The fquare heeling is fet up from the butt, having no block, and fometimes a long pole head, inftead of a fquare head for a topgallant-maft.

After the length is fet off, fet back three inches and a half in every yard in the length for the ftop, and three-fifths that below for the hounds. Then from the ftop fet up three times that length, and two-thirds more for a long pole-head. The diameter of the upper part of the long pole-head to be two-thirds of the lower part, and line ftraight the whole length of the pole-head, and all below as the top-maft.

TOPGALLANT-MASTS line fimilar to the mizen top-maft, and have commonly pole heads, either ftump, common, or long. A ftump pole-head is the length of a fquare head; a common pole-head is feven-eighteenths of the length, fet up from the ftop; and a long pole-head is two-thirds the length to the ftop, and is fet up as above.

ROYAL MASTS line fimilar to the ftump-head of topgallant-mafts, and have a fquare head. They are feldom ufed.

BOWSPRITS. Bowfprits made of two trees are lined two-thirds the diameter athwartfhips, and each tree to one-half the diameters fore and aft, adding the thicknefs of the coaks.

Side-fifhes are commonly fawed out of one tree ftraight down the middle, and one-fourth the diameter fet off on each fide for the thicknefs. The length is the whole length of the bowfprit.

Bowfprits made of one tree have a ftraight line ftruck along the middle, and the bed fet up from the butt three-tenths the length of the bowfprit, and fix inches added. Then fet up the whole length from the butt, and within that length four inches for every yard, for the long fquare on the upperfide, and one-third that for the fhort fquare on the underfide. Then divide between the bed and outer end into four equal quarters; that next the bed is the firft quarter, and fet off the diameters as before; at the bed as in the Table of Dimenfions; at the firft quarter fixty fixty-one parts of the diameter at the bed; at the fecond quarter eleven-twelfths; at the third quarter four-fifths; at the outer end five-ninths; and at the heel fix-fevenths: they are then to be lined to that fize with a fair curve.

YARDS, made of two trees, have each tree lined long enough to fcarf four feet beyond the firft quarter next the middle or flings, which is in all five-eighths the length of the yard, adding four feet; then ftrike a ftraight middle line, and fet up from the butt four feet for the haunch; from thence one-eighth the length of the yard for the middle, and the fame on the other fide for the length of the fcarf; from the middle to the end it is divided into four quarters; that next the middle is the firft. The diameters are fet off at the flings, as in the Table of Dimenfions. At the firft quarter on each fide thirty thirty-one parts of the diameter in the middle; at the fecond quarter feven-eighths; at the third quarter feven-tenths; and at the outer ends or arms three-fevenths. They are then lined and fided to that fize; then canted, and a middle line ftruck on one of thofe fides, and the middle and the quarters fquared up thereon from the middle line on the firft fide, and the fame diameters fet off as before; then lined and made fquare to the upperfide. The fcarfs line ftraight, from each quarter next the middle, to one-fourth the fubftance at the quarter next the butt, and three-fourths at the quarter next the middle; and haunches to about three inches at the butt. Thefe are the main and fore-yards of large fhips only.

All yards made of one tree line as the former, the fcarfs excepted.

NEW METHOD OF MAKING THE ABOVE-MENTIONED YARDS OF TWO TREES.

Yards made of two trees, by fcarfing them together, are the ftrongeft. They are made thus. Two trees of the fize wanted are fcarfed together, holding their diameters beyond the fifhes. The deficiency of the diameter is made good by long fifhes of fir, from four to fix inches thick, as the fize of the yard may require, extending two feet in length, at each end, beyond the long fquare on the aftfide, and each of fufficient breadth to form the eight-fquare on the outfide. The inner furfaces of the fifhes are coaked and fayed clofe upon the yards, the coaks extending near the whole length. They are trimmed eight-fquare, one quarter each way beyond the middle; the remainder is rounded, except the aftfide, which is left fquare two quarters each way, and then rounded, and the ends fhaped. Bolts are driven from the fore and after fides alternately, between the hoops, which are ftationed as ufual.

N. B. The yard would be ftronger were the fifhes not coaked for fome diftance from the middle, it having a tendency to weaken the fcarfs of the main pieces.

MIZEN-YARDS. Their diameters are ſet off from a line in the middle, as the former, but differ as follow. They are to be of the given diameter in the Table of Dimenſions, at the ſlings, which is one and one-half the diameter below the middle. At the firſt quarter, next the ſlings of the upper arm, thirty thirty-one parts of the diameter at the ſlings; at the ſecond quarter, ſeven-eighths; at the third quarter, three-ſevenths; and, at the arm, two-fifths. At the firſt quarter of the lower arm, ſixty ſixty-one parts; at the ſecond quarter, eleven-fifteenths; at the third quarter, three-fifths; and, at the arm, two-thirds. When timber is ſcarce, yards are ſometimes lengthened at the arm, where the wood is not ſufficient to gain the whole length. They only differ from the former by having a tongue at the end, lengthened and tapered to one-eighth the ſubſtance from one-third the length of the arm-piece, and a butt on each ſide, one-ſixteenth the diameter. The arm-piece is cut to make good the length of the yard-arm, with jaws in the largeſt end, to receive the tongue. This method is much uſed at ſea, when the yards are damaged at the arms.

Lower-yards of merchant ſhips commonly have a ſquare place raiſed at each yard-arm for a ſheave-hole for the topſail ſheets, and ſometimes the cleats, or ſtops, are raiſed from the ſolid of the topſail and other yards.

Maſts, bowſprits, and yards, after they are lined, have their ſides hewed or ſawed perpendicular to the lines on the upper ſurface. Sawing is beſt and cheapeſt, eſpecially for large maſts, as the pieces ſawed off ſerve for fillings, cant pieces, &c.

Workmen, hewing where much wood is to come off, are apt to wound and weaken the maſt, which ſhould be carefully avoided. After a maſt or any part thereof is ſided, it is canted, and a ſtraight middle-line ſtruck along one of the ſides, and the quarters and other diviſions ſquared up from the firſt middle-line, and the ſizes and diameters ſet off as before from this new middle-line. The ſides are then hewed or ſawed ſquare to the ſurface from thoſe lines, and, after that, eight-ſquared thus, viz. Five twenty-fourths of the diameters are ſet off on each ſide the middle-line; on every ſide, or ſeven twenty-fourths ſet in within the edges, and lines ſtruck with fair curves; then the angles or edges are taken off ſtraight to the lines on each ſide. Here the maſtmaker may be readily aſſiſted by his rule, it having the proper diviſions.

Lower-maſts are lined eight-ſquare from the heel to the lower part of the hounds, except they have cheeks, then to the lower part of the cheeks; and from thence break off, on the fore and after ſides, to the breadth of the cheeks at the lower part of the head.

Top-maſts, from the upper part of the heeling to the under part of the hounds, are eight-ſquare; as alſo the block below the heel of main and fore top-maſts.

Topgallant-maſts and mizen top-maſts, with long pole heads, are eight-ſquare from the upper part of the heeling to the under part of the hounds, and above the ſtop to the upper part of the pole head.

Bowſprits are eight-ſquare from the heel to the ſquare part at the outer end, except thoſe of cutters or veſſels that have their bowſprits upon deck: they are left ſquare within the bow one-fourth the length.

Yards in general are eight-ſquare, except thoſe lower ones in the merchant-ſervice that have ſquare parts left for the ſheave-holes and boom-irons at their arms or outer ends.

PUTTING TOGETHER AND COMPLETING MASTS, BOWSPRITS, YARDS, &c.

SPINDLES OF MASTS, compoſed of two pieces, are coaked together in the middle, with a coak and plain four feet long. Half the ſpindle is raiſed upon blocks, with the middle ſurface up-

wards, and planed ſmooth. The blocks are long enough to reach through a little diſtance on each ſide, for ſetting the ſpindle ſtraight, if required. A ram-line is made faſt in the middle of one end, and hauled tight; it is then faſtened in the middle of the other end, and, where a ſpindle deviates from a ſtraight line, a block ſhould be fixed underneath, and a cleat nailed thereon, and the place ſet ſtraight, by wedges driven between the cleat and the ſpindle. A middle-line is then ſtruck on the ſpindle, ſtraight with the ram-line, and ſquared down at each end. The length of the coaks is then ſet up from the butt; firſt, three feet ſix inches from the butt, and four feet from that for the firſt coak; and ſo on by four feet to the upper end, ſquaring them acroſs from the middle-line, and down on each ſide. The breadth of the coaks is lined, to have two inches good wood when the ſide-trees are coaked on and placed in the middle. The coaks are ſunk one inch and a quarter to one inch and a half, and are cleared out by a mallet and chiſſel. Be careful to ſink the coaks no deeper than the gage, as the maſt is weakened thereby. After the coaks are ſunk, and cleared out, the other half of the ſpindle is canted on, with its middle ſurface to the other, and ſet ſtraight and cloſe, with croſs-ſetts where neceſſary. The butts of the coaks are then ſquared up, upon each ſide the upper half, from the ſides of the lower one, and the middle-line at each end. The diſtance between is then taken with compaſſes, and to that is added the thickneſs of the coaks, and that gage pricked off from the ſurface of the lower half to the ſides of the upper one, and a line ſtruck on each ſide to range through the ſame. The upper half is then canted off upon blocks, and a ſtraight line ſtruck along the middle to that ſquared up at each end from the lower one. The butts of the coaks are then marked acroſs and lined to their breadths, and ſawed acroſs to the line on each ſide, and the intermediate wood, and that on each ſide the coaks, dubbed away ſtraight, the coaks only remaining. A ſcore is taken out of the middle of a batten to go over the coaks, and ſo uſed to prove it ſtraight. Obſerve, the coaks are to remain no higher above the ſurface than the depth of thoſe ſunk in the other half. Before the pieces are canted together, let a ſmall chamfer be taken off the edges of the coaks, and both ſurfaces tarred with ſoft tar; then cant one on the other into its place, and both muſt be ſet cloſe together with croſs-ſetts, and bolted with bolts, from one inch to three quarters diameter, five feet aſunder, through holes bored in the middle with an auger one-quarter of an inch leſs than the ſize of the bolts. The bolts muſt not be driven quite through, that the ſpindle may be reduced where neceſſary.

SIDE-TREES, each compoſed of two pieces, are coaked together in the middle, ſimilar to the ſpindle. Each piece of the ſide-tree is often worked ſhort of the whole length, the deficiency being made good by pieces ſcarfed to them at the heel, in the following manner, viz. Half the length of the ſcarf is the length of the coaks, which are three inches broad, and are placed at the end of each other on each ſide the middle-line; that next the butt is ſunk to one inch and three-eighths, and the next raiſed one inch and three-eighths.

The coaks that unite the pieces of a ſide-tree together in the middle contain an equal part of the ſide-tree and heel-piece in their breadth along the ſcarfs, and all above is divided into a coak and plain four feet long, and one-third the thickneſs of the ſide-tree broad, and lined neareſt the inſide edge, to have two inches good wood. When the ſide-trees are coaked to the ſpindle, they are fayed and bolted together, through the middle, with bolts one inch to three quarters diameter, ten feet aſunder, except in the ſcarf. There ſhould be two bolts in each ſcarf, and the firſt bolt two feet above the heel or butt of the ſide-trees.

After the ſide-trees are bolted together, their inner ſurfaces are planed ſtraight and fair, and the haunch, at the butt, at the upper ends, diminiſhed from four feet to two or three inches; a ſtraight line

is then ſtruck along the middle of the ſurface, ſquared down at each end, and the coaks ſet off. From the lower end ſet up two feet for the butt of the firſt coak, and let its breadth be one-third the breadth of the ſide-tree, and placed in the middle, within the haunch at the upper end. The intermediate ſpace is divided into a four-feet coak and plain; the butts of the coaks on one ſide to come to the ends of thoſe oppoſite, and all the butts to be ſquared acroſs from the middle-line and down the ſides. The breadth of the coaks to be one-fourth the breadth of the ſide-tree, and half their breadth from the middle-line on each ſide, and ſunk to one inch and a half, or leſs, as before. The ſide-tree thus compleated is canted upon the tongue, or lower part, of the ſpindle, and ſet ſtraight and cloſe with croſs-ſetts. Then ſquare down the butts of the coaks, the haunch, and the middle-line at the ends, from the ſides of the ſide-tree to the ſides of the ſpindle; then, with compaſſes, take the diſtance they are aſunder, and the thickneſs of the coaks, and ſet off that gage from the underſide of the ſide-trees to the ſides of the ſpindle, and ſtrike the line.

The ſide-tree is canted off, and a line ſtruck on the middle of the ſpindle to the ſpots ſquared down, the butts of the coaks ſquared acroſs, and their breadths taken from the middle-line of the ſide-tree, and ſet off from that on the ſpindle; the coaks are then raiſed as before, chamfered, tarred, and canted again on the ſpindle into its place, and ſet cloſe. Thus the ſpindle and ſide-tree are canted that the other ſurface of the ſpindle may lie upwards, for coaking on the other ſide-tree. The whole is then bolted together, with bolts from one inch to three-quarters diameter, five feet aſunder, and the holes bored through the middle of the coaks. The haunch, being leſs in ſubſtance, is faſtened to the ſpindle with dump nails.

The maſt is then canted, and hewed to its ſize athwartſhips, from a ſtraight line ſtruck along the middle of the fore or aft ſide. The heighth of the partners, quarters, &c. are then ſet up, and the different diameters ſet off and lined as before directed.

The maſt is again canted, and a middle-line ſtruck on the athwartſhip ſide, it lying upwards, from the heel to the head, and the partners, quarters, &c. ſquared up from the firſt middle-line; then line the maſt for the eight-ſquare by ſetting off five twenty-fourths the diameter of each place from both ſides the middle-line, from the heel to the lower end of the cheeks, and from thence to line off to nothing at the lower part of the head. Set down the ſides below the edge, as much as the line for the eight-ſquare is within the edge, allowing three-eighths of an inch for reconciling. When the fiſh is on, lines are then ſtruck to theſe ſpots, and the wood between them dubbed away ſtraight from line to line. The other 'thwartſhip ſide is then canted up and eight-ſquared.

The maſt is again canted, and one of the fore and aft ſurfaces laid upwards, for coaking on the ſide-fiſh. The butts of the coaks are ſet up from the heel on the middle-line, and ſquared acroſs thus; the butt of the loweſt coak to be three feet above the heel, and three feet nine inches in length; the next coaks come among the ſcarfs of the heel-pieces, and are ſo diſpoſed as to have two coaks in length, in a ſhort ſcarf, and three in a long one; and the breadth of the coaks to come equally on each piece. Above the ſcarf to the ſecond quarter to have a coak and plain four feet long, one on each ſide the middle-line, and the butts on one ſide to come in the middle of the coaks on the other, and ſquared acroſs from the middle-line. The coaks to be in breadth one-third the breadth of the fiſh, and equally placed between the middle-line and edges of the fiſh. All above the ſecond quarter are ſingle coaks, placed in the middle, of the ſame length as the lower ones, and to be eight inches broad, the upper one five inches; a line ſtruck from one to the other gives the breadths of the intermediate coaks. Every butt muſt be ſquared from the middle-line, and raced acroſs from ſide to ſide.

SIDE-FISHES are planed ftraight and fair on the infide furface and edges, then canted on the mafts, and fet ftraight and clofe to the middle-line; the breadth of the fifh is then marked on the maft, and the butts of the coaks fquared up from the maft on to the fides of the fifh, and the middle-line at the ends. The fifh fhould be funk in the maft and raced along its fides with compaffes, from the furface of the fide-trees and the haunch at the upper end. The fifh is then canted off, and a middle-line ftruck on the infide, and the butts of the coaks raced acrofs, that their breadths, taken from the maft, may correfpond. The coaks are raifed on the maft by taking away the intermediate wood, to the breadth and depth the fifh is to be let into the maft, which is one inch and a half to two inches in large mafts, and the coaks left above that furface are from one inch and one-eighth to one inch and three-eighths, and are funk to the fame depth in the fifh. The whole to be cleared out, and the edges taken off with a chamfer, the furfaces tarred, and the fifh again canted on the maft into its place, fet clofe down with crofs-fetts, and faftened to the maft with dump nails, twice the thicknefs of the fifh in length. The fide-fifh on the oppofite fide of the maft is coaked on in the fame manner.

The maft is now fquared to its fize, the fore and aft way, by a fquare or batten; the latter is laid acrofs the fifh parallel to the middle-line on each fide, and what it exceeds the half diameter of the maft is fet below the edge of the batten on each fide the fifh, and this is repeated at the partners, quarters, &c. then lined with a fair curve to the fame, and the wood dubbed off ftraight to the line on each fide. A ftraight line is then ftruck along the middle, and the eight-fquare lined from it as before, and dubbed ftraight through to the 'thwartfhip fides. In the remaining angles, between the furface of the maft and the fides of the fifh, are fayed and nailed cant pieces, which are dubbed ftraight with the eight-fquare. The maft is then canted twice, for the other fide to be fquared and finifhed in the fame manner.

The maft is then fixteen-fquared, rounded, and planed fmooth from the heel to the hounds, except the furfaces left for coaking on the cheeks, which are rounded a little at the lower part, one-third their length.

The maft, thus far compleated, is hooped, the upper mould hoop is placed in the middle of the hounds, and the others equally fpaced between that and the loweft mould hoop, which fhould be eight inches above the lower end of the cheeks. The other hoops are circular, and divided into two drifts. The upper drives on from the head of the maft, and the loweft hoop comes within two feet of the partners; the reft are equally fpaced about four feet afunder. The lower drift drives on from the heel of the maft, and the upper hoop placed within two feet of the partners, and the others about two feet each way clear of the decks. Below the decks the hoops are equally divided, to the heel hoop, which is one foot feven inches above the heel of the maft.

Moulds are made to the upper hoops, that are not circular, as a guide for the fmith; they are fayed to the fhape of the maft, and nailed together at the corners, one foot below the ftation of each hoop, and the number of the ftation marked on the upper fide. Circular hoops are made to girths taken round the maft at the ftations of the hoops. That they may be tight, one inch is cut off the girth of the firft hoop of each drift, after it is fitted to the maft, and gradually increafes, cutting off from the other girths to one inch and three-eighths at the girth of the laft hoop; the other drift the fame. Obferve, the firft hoop of each drift is the largeft. The hoops are made of iron, four to four inches and a half broad, half an inch or five-eighths thick, and the edge that firft goes on the maft is chamfered on the infide.

The hoops are heated nearly red, then driven on the maſt to their ſtations by long round bars of iron, called pokers, flatted on the feet. They are ſwung backwards and forwards, by the working, ſtriking the edge of the hoop on each ſide the maſt, which is well greaſed with tallow to facilitate the driving the hoop, and prevent the maſt from burning. The hoop, when driven to its ſtation, is cooled with water, which ſhrinks it and increaſes the tenſion. The upper drift and mould hoops are driven on from the head, and the lower drift from the heel, of the maſt.

CHEEKS made of two pieces are coaked together in the middle, and the edges planed ſtraight and ſquare. Then ſet off the coaks; the butt of the firſt is to be one foot above the lower end of the cheek, and from thence to the head divided into coaks and plains three feet in length each. The butt of the coak to be nine inches ſhort of the ſtop, and the breadth of the coak at the upper end one-third the thickneſs, and placed in the middle, and the remainder lined from the inſide edge, ſo as to leave a two or three inch margin on the outer edge, and ſunk one inch and an eighth deep. The other half is then canted on and ſpoiled for faying as before; and when fayed cloſe the pieces are bolted together through the middle with bolts ſeven-eighths of an inch diameter, the firſt bolt five feet from the lower end, and the others four feet aſunder, and not driven quite through. The breadth of the cheeks is next ſet off from a ſtraight line ſtruck along the middle, and the edges trimmed ſquare and planed ſmooth with the inner ſurface, and then the exact thickneſs ſet off from the inſide. The outſide of the cheek, at the lower part, is rounded from the lower end to the hounds, and two-thirds the thickneſs of the cheeks is ſet up from the inſide on the foremoſt edge, and one-third on the after edge, and a line ſtruck. Below the line remains ſquare, and above is divided into two equal parts on each ſide, and a ſtraight line ſtruck along the back of the cheek, from the lower end to the under part of the hounds, one inch and a half from the middle-line towards the foremoſt edge, and from thence dubbed or bearded ſtraight to the firſt line, down on each edge. Then another line is ſtruck in the middle of that bearding on each ſide, and again bearded from thence to the next line upon the edge. Then divide each of thoſe ſquares into four equal parts, and ſtrike lines to the diviſions next the edges, and dubb the edges off to the line on each ſide, then round it ſmooth with planes, and bring the rounded part of the cheek in with a ſweep at the lower part of the hounds. Above the hounds to the ſtop, a large chamfer is taken off the after edge of each cheek. The head of the cheeks above the treſtle-trees is bearded on the outſides, from one-third the breadth to three eighths of an inch down on each edge.

The cheeks are then canted, the inner ſurface to lie upwards, on which a ſtraight line is ſtruck along the middle, and ſquared down at each end; then, with a ſtaff laid along the maſt, ſet off the ſtations of the hoops from the lower end of the cheeks; do the ſame on the middle-line of the cheek; then diſpoſe the coaks thus; ſet down eighteen inches from the upper end of the cheek for the butt of the firſt coak, and three feet ſix inches for its length, which, ſquared acroſs, makes the firſt butt of the coak: and from thence to the hoop below the hounds on the oppoſite ſide all the coaks are to be the ſame length, if the upper part of the cheek admits. The other coaks are equally divided in length between the hoops; the whole to be ſix inches broad, and placed half their breadth on each ſide the middle-line; the laſt coak is to be one-third the breadth of the cheek, and placed in the middle at three-fourths the length of the cheek from the head. The cheeks are then canted on the upper part of the maſt, and laid ſtraight with the middle-line on the maſt, and ſet cloſe. Then ſquare down all the butts of the coaks upon the maſt, and the butt of the hollow, and each ſide of the hoops to the ſides of the cheeks. Then, from the underſide of the cheeks, ſet down upon the maſt on each ſide (with compaſſes) one inch and a quarter, the depth of the coaks, and ſtrike a line to the ſame

parallel with the edge of the cheek. The cheek is then canted off, and the butts of the coaks raced acroſs on the maſt, and the edges of the hoops upon the inſide of the cheeks, and the breadth of the coaks correſpondently taken from the middle-line on the cheek, and ſet off from the middle-line on the maſt; the coaks on the cheeks to be ſunk one inch and a quarter deep, and raiſed the ſame on the maſt. One-fourth the length of the cheek from the lower end is hollowed to the convexity of the maſt. The workman, to perform this with exactneſs, bends a piece of iron hoop round the maſt, and hollows the cheek to the ſame, leaving a margin at each ſide twice the thickneſs of the hoops, which are let in the cheek their thickneſs in the hollow, and the depths of the coaks beſide.

Cheeks made of one piece ſometimes table on to the maſt-head thus; eighteen inches is ſet down from the upper end of the cheek for the firſt butt, and twenty-two inches from thence for the length of the tables, and that continued as low as the firſt half of the cheek, and from thence to three-fourths the length of the ſame, dividing into running coaks three feet in length. The butts of the coaks and tables are all ſquared acroſs from the middle-line and down the ſides, and the breadth of the tables within three inches of each edge from the middle-line, and one table ſunk one inch and a quarter deep, the other left alternately on each ſide the middle. The coaks to be ſix inches broad, the firſt next the tabling placed in the middle. The others placed four inches on each ſide the middle-line alternately, and the remainder of the cheek hollowed as before.

The edges of the coaks and tables, after they are ſunk and cleared, are chamfered, and the ſurface of the cheek, and the maſt where it fays is paid over with ſoft tar; the cheek is then canted on the maſt into its place, and ſet cloſe as before. The maſt is then canted twice, and the oppoſite cheek compleated in the ſame manner.

The edges of the cheeks are rounded above the upperſide of the treſtle-trees to the underſide of the cap, nearly.

The cheeks are farther ſecured to the upper part of the ſpindle by hoops, bolts, and nails, as follow. Six hoops on the head of large made-maſts, and four or five on ſmaller. The upper hoop to be its breadth below the underſide of the cap, the others equally ſpaced on the head of the maſt, and to have one hoop its breadth below the ſtops; moulds are made to the hoops as before. There are to be two bolts between every hoop on the maſt-head, driven through the cheeks athwartſhips, one at one edge, the other at oppoſite angles, except at the upper and lower hoop, which are to have one bolt at each edge clear of the treſtle-trees, and ſix bolts in the hounds, two next the hoop at the upper part, two in the middle, and two through the lower end above the ſweep, and three or four bolts below the hounds, all to be driven through alternately, one from the ſtarboard, and the next from the larboard ſide, and clenched on a ring; and, in ſize, from ſeven-eighths to one inch: the auger to be one quarter leſs. The lower part of the cheeks is faſtened with dump nails, twice as long as the cheeks are thick, and three between each hoop. The cheeks are then planed fair and ſmooth, and the lower ends haunched away with a ſnape, reſembling the bill of a duck.

Laſtly, the maſt is canted, the foreſide to lie upwards, and the oak chock between the treſtle-trees is to be fayed, and bolted through the maſt. The chock to be in length the width of the lower part of the maſt-head; in breadth, the depth of the treſtle-trees; in thickneſs, the ſame as the wood between the two holes in the lower cap, with three-eighths of an inch added for the leather, and to be bolted with two ſmall bolts, one in each oppoſite corner. Next the chock is a front-fiſh, hollowed and fayed to the foreſide of the maſt thus. The inner ſurface is firſt planed ſtraight, and the edges ſquared and hollowed to the convexity of the maſt, the ſame as the lower part of the cheeks, leaving a margin on the inner ſurface at each edge twice the thickneſs of the hoops, and rounded on the back

to half the thicknefs on the fides; then cant it on the maft, the middle of the fifh to lie ftraight with the middle-line on the maft, and the upper end clofe againft the chock. Then fquare the hoops up to the fides of the fifh, and with compaffes race their thicknefs. Then cant off the fifh, and race the hoops acrofs, and take out the fcores to their thicknefs; tar over the infide of the fifh, and cant it again into its place on the maft, and nail it with nails twice its thicknefs in length.

FILLINGS are pieces fayed to the fide of the maft, edges of the front-fifh, and cheeks, and make a fair furface for the wooldings. They are fometimes made the whole length of the front-fifh, but often no longer than fufficient for the breadth of the woolding, and their ends fnaped and nailed clofe to the maft. They are fayed by moulds to the fhape of the maft and fifh, and marked on the ends of the fillings at each place, and the filling trimmed thereto; the long fillings add fecurity to the maft, and prevent the lodgment of water.

Short fillings are remedied by fnaping their ends, and the long fillings are fayed by moulds at the ends and middle; the middle moulds undergo a fecond operation, being firft fayed to the maft, the edge of the fifh, and the cheek, with a ftraight back, to keep them out of winding, and then reverfed by another mould, to be applied in the fame manner on the filling. The fillings when fayed are paid over with tar on the infide, and nailed to the maft, then rounded on the back, to form a fair curve with the upperfide of the fifh, cheeks, and fides, of the maft. The lower end of the long filling fnapes as the lower end of the cheeks. At the lower end of the fifh is driven on a hoop, called a fifh-hoop, which is beat clofe to the fides of the maft. In feventy-four gun fhips and upwards is another hoop put on over the fifh and fillings, called a clafp-hoop. It has a hinge in the middle, and keys together at the ends through mortifes made long enough to admit two forelocks, that drive through contrarywife, which encreafe the tenfion of the hoop, and are nailed to the maft.

A fquare tenon is made at the head of the maft for fixing on the cap; it is made tapering from the lower part or depth of the cap, thus; the tenon is two inches lefs than the maft-head in large fhips, and one inch and a half in fmall ones, and half that is fet on each fide the middle-line athwartfhips, at the upper part, and one quarter of an inch more at the lower part, and taken fquare through and parallel to each other fore and aft. The tenon is to ftrengthen from the aftfide, to prevent the cap drooping below a level, by tapering the forefide of the maft-head from the lowerfide of the cap to as much as the fides are lefs than the maft-head at the upper part, and the aftfide of the maft-head half as much. A fquare tenon is likewife made for fixing the heel of the maft in the ftep, and is two thirds the given diameter athwartfhips, and one-half fore and aft at the upper part, and tapers one inch and a half in the depth, (which is one-third the given diameter,) in large, and three-fevenths in fmall, fhips.

TRESTLE-TREES are fawed or hewed to their fizes thus. In length, they are one-fourth the length of the top-maft; in depth, half the given diameter of the maft; and in thicknefs, two-thirds of the depth. The infides are trimmed ftraight, and out of winding, and the thicknefs fet off parallel thereto. The upperfides line ftraight and fquare, and the depth parallel. The underfides are fnaped at each end, and the edges chamfered the length of the fnape. One end to be once and a half the depth, the other end once the depth only, within the ends, and the fnapes are lined to half the depth of the treftle-tree, and rounded to a fweep at the ends; the lower outer edge is chamfered along the whole length, and the infide only to the crofs-trees.

The longeft fnapes to be at the foremoft ends of the main treftle-trees, and the after ends of the foremaft treftle-trees.

Crofs-trees are hewed or fawed to their fizes thus. In length, they are one-third the length of the topmaft, deducting fix inches; the breadth as much as the treftle-trees are thick, and the depth two-thirds the breadth. The upperfides are trimmed ftraight and out of winding, and the depth parallel thereto. Their infides are lined ftraight and fquare from the upperfide, and the breadth parallel to it, and are tapered at each end on the underfides one-fourth the length of the crofs-trees, from the end to half the depth, and the ends rounded off with a fweep, and the edges chamfered on the underfides and round the ends the length of the fnapes.

FRAMING OF THE TRESTLE AND CROSS-TREES. The treftle-trees are kept afunder parallel to each other the breadth of the maft-head athwartfhips at the ftops, except what the treftle-trees face on the fides of the maft, and fquare with each other at the ends, and are confined in a temporary manner by pieces of fpar, one towards each end, fcored in between, and lapped on each treftle-tree, and the lap nailed thereto, to prevent its flipping.

The crofs-trees are next laid acrofs the upperfides of the treftle-trees at right angles, or fquare with their lengths, and the middle of the crofs-trees kept in the center between the treftle-trees; and the aftfide of the foremoft crofs-tree the depth of the maft-head fore and aft, from the middle of the treftle-trees; and the middle of the treftle-trees kept well with the forefide of the maft-head; and the forefide of the after crofs-tree twice the depth of the maft-head, abaft the middle of the treftle-trees. The breadth of the crofs-trees is then raced upon the upperfides of the treftle-trees by compaffes, and fquared down the fides. The thicknefs of the treftle-trees is likewife raced on the underfides of the crofs-trees, and fquared up their fides; the crofs-trees are then removed, and fcores cut in the treftle-trees to let them down within one inch (or three-quarters, in fmaller fhips) of their depth, except the facing on the outfides, which is taken in fquare to the whole of their depth; a fcore is likewife taken out of the underfides of the crofs-trees to the breadth and depth of the facing on the treftle-trees; but the latter is performed with more exactnefs when the treftle-trees are got in their places on the maft. On each fide the fcores in the treftle-trees is driven a fmall bolt, through from the upperfide, to fecure the fhort wood, and clenched on a ring.

An iron plate, three-quarters of an inch thick, three-fourths the fquare hole long, and two-fifths the thicknefs of the treftle-tree broad, is let in on each fide, to keep the fid from rubbing the treftle-tree.

The treftle-trees are next got into their places, and face on the 'thwartfhip fides of the maft as follow. Firft, the head of the maft muft be elevated, by barrel or other fcrews, more than half the length of the treftle-trees, or elfe got over a hole or cellar, as are in fome maft-houfes, conveniently fitted with fcuttles, or launched an end over a wharf, and a ftage made under the head. The maft fhould be fixed perpendicular to its diameter.

The treftle-trees are next got up into their places with a tackle, and fixed by fhores on the 'thwartfhip fides of the maft. Their lower fides reft upon the ftops, their middle is kept well with the forefide of the maft, and their infides perpendicular and parallel. The foremoft ends are to drop as much below a fquare with the middle-line on the maft as the maft is defigned to rake aft in the length, that they may be level when the maft is in its place. In this pofition they are made to bed firm on the ftops, being fquare athwart from the middle-line. One inch and an eighth of the treftle-trees to be let into the maft, and marked with compaffes on the upperfide of the chock, and lowerfide of the maft from their infides; and from the fides of the maft on the upperfides of the treftle-trees. Then race by the upperfide of the chock and underfide of the maft upon the infides of the treftle-trees, and the upperfides of the treftle-trees down the fides of the maft. The treftle-trees are then lowered

down, and one inch ſet down from the upperſide of the maſt at the middle of the chock on each ſide, and one inch and a half at the upperſide of the treſtle-trees, and that wood taken away to the race upon the upper and fore ſide of the chock, then ſet up one inch and a half from the underſide of the maſt at the ſtop, and one inch at the upperſide of the treſtle-tree; ſtrike a line, and cut away the wood ſquare to the race underneath. The ſame is ſet off on the inſides of the treſtle-trees, and the intermediate wood cut away to the depth of the race on the upperſide, ſo that what it is faced in on the maſt remains on the treſtle-trees.

The treſtle-trees are then got into their places, ſet cloſe, and bolted to the maſt-head, with three bolts, one inch to one inch and a quarter diameter, one through the underſide next the ſtop, one through the upperſide next the upperſide of the treſtle-tree, and one through the middle of the chock; the holes to be bored through three times their diameter from the edge. The bolts in the treſtle-trees are driven from contrary ſides, and are clenched on a ring. It is beſt not to bolt the treſtle-trees but when the maſt is for preſent uſe.

The croſs-trees are now faced on to the treſtle-trees, as before deſcribed.

BIBS are brackets, made of elm plank, from three to five inches thick, and nine-elevenths the length of the hounds in length, and in breadth ſix-fifteenths their length. The after edge is firſt lined ſtraight, and the upper part ſquare from that, and the fore part tapered by a moulding to four or ſix inches broad at the lower ends. The after edge is fayed on the cheeks, and the upper part againſt the underſide of the treſtle-tees on the foreſide of the maſt: viz. In the middle of the after edge, ſet up one inch and a half, and line ſtraight from that to nothing at the lower end, which makes a butt in the middle; then place the bibs on the maſt, their thickneſs within the ſides of the cheeks, and their upper parts to the outſide of the treſtle-trees; then let one inch and a half be raced by the lower edge of the bibs upon the cheeks, and the wood taken out to that depth, and the thickneſs of the bibs, that they may bed firm therein; they are then bolted edgeways through the cheeks with four bolts driven from the foreſide and clenched on a ring on the aftſide. The bolts to be in diameter from one inch to ſeven-eighths or three quarters in ſmall ſhips maſts, and only three in number. The lower end of the bib is rounded off to the ſurface of the cheek, and the edges chamfered.

BOLSTERS are pieces of fir fayed upon the upperſide of the treſtle-trees, and againſt the 'thwart-ſhip ſides of the maſt-head. They muſt be ſufficiently long to clear the fid-hole and after croſs-tree and broad enough to project one inch and a half, or more, without the treſtle-trees, and the ſame in depth, and rounded from the upper to the lower edge on the outſide, and nailed to the treſtle-trees at each end. They are to prevent the ſhrouds chafing by the motion of the maſts.

CAPS are next ſawn and trimmed and firmly fixed on the maſt-head thus. The main and foremoſt caps of large ſhips are of elm, and made of two pieces, coaked or douled together in the middle; and others are of one ſolid piece.

Main cap, in length, to be four times the diameter of the topmaſt, adding three inches. The breadth to be twice the diameter and two inches added, and the depth four-ninths the breadth.

Fore cap, in length, to be four times the diameter of its topmaſt, adding two inches. The breadth to be twice the diameter, adding one inch, and the depth four-ninths the breadth.

Mizen cap, in length, to be four times the diameter of its topmaſt, adding one inch. The breadth to be twice the diameter, and the depth four-ninths the breadth.

The caps of yachts and ſimilar veſſels have a ſheave-hole on each ſide for the jeers of the lower yards.

Caps are trimmed or fawed to their dimenfions, and their upper and under fides made ftraight and out of winding, and the ends and fides made fquare. If the cap is made of two pieces, to one piece is added the thicknefs of the coak. The coak is raifed from this half, about one inch and a quarter on the middle furface, extending the whole length, and is broader on the furface than at bottom, refembling the tail of a dove, and is termed a dovetail. The bottom is one-third the thicknefs of the cap, placed exactly in the middle, and three-eighths of an inch wider on the furface on each fide the middle-line; the thicknefs of the coak is lined down on each fide parallel with the furface, and fquared acrofs at each end, the wood is then taken away on each fide to form the coak. A coak is then funk in the other half to fit the former, and driven together by malls, or by a carling flung. The two pieces are then bolted through with fix bolts, one inch diameter, two at each end and two in the middle, which are driven from each fide alternately and clenched on a ring.

The holes are fet off from the centre of the underfide of the cap at equal diftances; the fubftance left between the holes to be two-fifths the diameter of the round hole, and half the tapering of the maft-head in its length. The round hole is the foremoft one, and is fwept round with compaffes three quarters of an inch larger than the diameter of its topmaft, (to allow for leathering,) and is fquare from the underfide to the cap's length and breadth, and parallel to its thicknefs. The fquare hole is fet off a little lefs than the lower part of the tenon on the maft-head, and tapered from a fquare to the fize of the upper part of the tenon upon the upperfide of the cap, to fix on tight. The boundaries of the holes are notched, and a hole bored through with an auger, at the oppofite corners of a fquare hole, and one only in the fide of the round hole, to faw them out to their fizes. Four large eye-bolts are then driven through the cap from the underfide, one inch and feven-eighths to one inch and three-quarters in diameter, for hooking the top-block, &c. and, as the weight of the topmaft and yards depends thereon, the iron fhould be the beft, and the eyes free from flaws. One of the bolts is placed on each fide the fquare hole near the edge of the cap on the underfide, and one on each fide the round hole, at the forepart, perpendicular or fquare to the length and breadth. Thefe bolts are well clenched upon an iron plate let into the upperfide of the cap.

Caps douled together in the middle have three fquare mortifes funk in the joining furfaces of each piece, one in the middle and one in each end lengthways, of equal fizes, and placed in the middle of the cap's thicknefs, about four inches fquare, and four inches deep. Oak tenons are then fitted tight into thefe mortifes to fix into the mortifes of the other piece, and bolted fimilar to the former.

The round holes of all caps are leathered and nailed on the upper and lower fides.

In letting on caps, to allow for their fhrinking, the fize of the tenon is taken one inch and a half above the ftops, and that fet off on the underfide of the cap. The fame attention is paid in cutting out the mortife in the fteps, for the tenons at the heel. The caps are alfo to be raifed above a level from the middle-line on the maft one-quarter of an inch to a foot in length, to allow for their drooping.

Laftly. On the edges of the maft-head are fayed battens, let in over the hoops and faftened, and the edges are rounded, for the rigging to flide down eafy.

Mafts compofed of more or lefs trees, are coaked together. Thofe made of two trees are coaked together in the middle, as fide-trees, with a coak and plain four feet long. The heel-piece firft coaks on to the heel of the lower tree, and the head-piece to the upper tree, as they fcarf under the main pieces.

Mafts, made of fingle trees, and checked, are rounded below the cheeks, and tapered at the upper part as made-mafts, with the fame number of hoops on the head, but few or none on the body. The cheeks below the hounds are either woolded or hooped with clafp-hoops, and then finifhed as other mafts; but oftener hooped than woolded, in the Eaft India and merchant fervice.

Mafts that head themfelves (that is, thofe which have not feparate pieces to form their head) are rounded to the lower part of the hounds, and the head fquare to the given fractions. (See Tab. Dimenfions.) The hounds are raifed by the bibs, and are twice the breadth of the maft at their upper parts, and form a bracket on the fore part to the breadth of the maft at the lower part, or hounds; they are from three to four inches thick, made of elm plank, and a bolt, three-quarters or feven-eighths of an inch diameter, is driven through edgeways parallel to the upper end, to prevent their fplitting; they are then fayed to the fides of the maft athwartfhips at the hounds, with a coak in the middle. Their upper parts make the ftops for the treftle-trees, and are bolted with three bolts, feven-eighths of an inch diameter, and clenched on a ring. The lower ends are rounded to a femicircle, thinned with a duck's-bill fnape, and nailed to the maft.

The aftfide of mizen-mafts, in fhips, and main-mafts, in brigs, to be coppered in the wear of the gaff and boom.

Cutter's mafts are oftentimes left eight-fquare four or five feet above the deck, and from thence rounded to the hounds, as other mafts, and fitted with bolfters or crofs-trees like a top-maft. When they have crofs-trees, the heads are fquare, and fitted with a cap, fimilar to fhips top-mafts. Bolfters are only faftened to the maft when the maft and topmaft are made in one, and the topmaft above the ftops rounded, and the head above the hounds left fquare. An iron hoop is driven on the ftop of the topmaft hounds, with a ring at the fore part, and another hoop let on its breadth at the upper part of the head, with a round ring on the fore part, through which flides the topgallant-maft, and is retained at the heel by a bolt through the lower ring: a fheave-hole is cut fore and aft through the topmaft hounds, and commonly four large eye-bolts with fhoulders are driven from the aftfide through the maft-head, upon iron plates let in the maft, and clenched upon plates let in the forefide. The bolts are one inch and a quarter to one inch and a half diameter; the lower one is driven through the middle of the lower hounds, the fhoulder downwards; the other three are equally fpaced between the ftop of the lower hounds and the lower part of the topmaft hounds; the two lower ones are driven with the fhoulder on the larboard, and the upper on the ftarboard, fide. The aftfide of the maft to be coppered in the wear of the gaff and boom.

SLOOPS, SMACKS, HOYS, AND BOATS, MASTS, from a middle-line are trimmed thus. The heighth of the partners is two-thirds the diameter, taking feet for inches, fet up from the butt or heel, and there fet off the given diameter as before. In the middle between the partners and the ftop of the fhrouds, thirty thirty-one parts of the given diameter; at the under part of the hounds feven-eighths; at the upper part, feven-tenths; and to have ftops of one inch and a half, or two inches, on each fide athwartfhips in proportion to the fize of the maft. Topmaft, in the middle between the ftops, two-thirds of the given diameter; at the upper part, three-fifths; and the fquare head above the topmaft three-fevenths; and compleated as the former.

Boats mafts, not floop-fafhion, are trimmed round from heel to head thus: ftrike a ftraight line along the middle, and fet up the partners from the heel, which is the depth of the boat, and there fet off the given diameter; then fet up the whole length, and line it to two-thirds the diameter of the partners; with a fheave-hole its length clear of the ftop for the haliards.

TOPMASTS, main and fore, after being ſawed or hewed to the foregoing directions, are compleated thus: the block below the heel is left eight-ſquare, and a hoop, two inches leſs in diameter, is driven on the lower end. The heeling is to be ſquare, and the edges chamfered; and, if not ſufficient to fill the hole in the treſtle-trees, fillings are fayed and nailed thereto, to make good ſuch deficiency. From the lower cap it is trimmed ſixteen-ſquare, and rounded to the under part of the hounds, which are nearly eight-ſquared, to admit them through the round hole in the lower cap.

Sometimes ſhips in the Eaſt Indies, &c. have hound-pieces made of elm, teak, or harder wood than fir, fayed to their topmaſt-heads, and faſtened as bibs on lower-maſts that head themſelves.

The head is left ſquare above the ſtops, and the edges chamfered between the upperſide of the croſs-trees and underſide of the cap. The whole topmaſt is then planed fair and ſmooth, and a ſheave-hole cut through the block, in the middle of the after ſquare of the larboard ſide to the foremoſt ſquare on the ſtarboard ſide. The length the ſame as the depth. The breadth two inches for every foot in length, and ſo in proportion for all ſheave-holes. A groove is made on each angle of the heeling in the direction of the lower ſheave-hole, large enough to contain the top-rope, when paſſing through the ſquare hole in the treſtle-trees.

In the middle of the heeling, a ſquare hole is cut through athwartſhips for the fid; its lower part to be the depth of the treſtle-trees above the block. Iron fids are once and a half the given diameter of their lower maſt in length, one-third the given diameter of their topmaſt in depth, and two-thirds their depth in thickneſs. Wooden fids differ from the former in depth, being made one-half the diameter of the topmaſt. Fids are made ſquare, to the given dimenſions, and one end rounded, the other ſnaped from the underſide, and a hole for a lanyard in both ends.

The upper ſheave-hole for the top-rope to be four inches above the heeling, cut through tranſverſely to the lower one, by boring four or more holes through with an auger the breadth of the ſheave-hole, and then cleared ſtraight through with chiſſels: all other ſheave-holes in the ſame manner.

Eighteen-gun ſloops, and veſſels under that ſize, in the Royal Navy, and moſt ſhips in the Merchant-ſervice, have a ſheave-hole for the topſail-tye cut through the middle of the hounds fore and aft; but, as it weakens the maſt, it is better avoided.

Topmaſt treſtle and croſs trees are differently fitted from the lower ones. The length of the treſtle-trees is three inches and a half to every yard their topmaſts are in length; and each croſs-tree one-third longer than the treſtle-trees. Depth of the treſtle-trees, one inch and an eighth to every foot in the length. Breadth, two-thirds the depth, Depth of the croſs-trees, ſeven-eighths of the depth of the treſtle-trees. Breadth, one-fourth more than the breadth of the treſtle-trees. The treſtle-trees are trimmed ſimilar to the lower ones, and a ſheave-hole cut through the foremoſt end of each main-topmaſt treſtle-tree, not exactly fore and aft, but at angles with the length: the foremoſt ends to be without the middle of the treſtle-tree, to teach fair with the fore topgallant braces; there are to be, likewiſe, two ſheave-holes in the after ends of the fore-topmaſt treſtle-trees. The croſs-trees are trimmed (moſtly ſawed) ſtraight on their upper ſides, but mould ſtraight only one-third the length in the middle, and round aft from thence on each ſide with a curve one-third the diameter of the topmaſt, and one-half their breadth; they hold a parallel depth in the middle three-ſevenths the length, and taper from thence to half the depth at the ends, which are rounded, and a hole bored four inches within for the topgallant ſhrouds.

The croſs-trees are let into the treſtle-trees, with ſcores, as the lower ones, to half the depth of the croſs-tree, and face on half an inch. The middle of the treſtle-trees is kept well with the top-

maſt head at the foreſide, and the middle croſs-tree let in between that and the topgallant-maſt heel, the foreſide of the after croſs-tree to the exact ſize of the topmaſt-head, and the aftſide of the foremoſt croſs-tree about one inch leſs in the clear, and both faſtened to the treſtle-trees with bolts ſeven-eighths to five-eighths of an inch diameter, driven through the middle from the upperſide with a ſaucer-head, and ſecured underneath with a forelock turned upon a ring. They are then got over the topmaſt-head, and fixed firm on the ſtop of the hounds. Bolſters are fayed upon the treſtle-trees on each ſide of the maſt-head, like the lower ones.

The cap is trimmed and fitted as the lower cap, and differs little but in ſize, except in the eye-bolts, which are driven the ſame diſtance on each ſide the round hole, and are, in diameter, one inch and an eighth, to ſeven-eighths of an inch; the other bolts in proportion. Length, four times the given diameter of the topgallant-maſt, and one inch added. Breadth, twice that diameter. And depth, ſeven-fifteenths the breadth.

Cloſe up under the cap on each ſide athwartſhips are cheek-blocks, tenoned into the topmaſt-head. The length, twice and a half the depth of the head, and ſix inches added for the three tenons. Half the depth of the head in thickneſs, and two-thirds the depth in breadth; made of elm; and the whole thickneſs divided to make the tenons, ſheave-holes, and back. Viz. The depth of the tenons and the thickneſs of the back are each three-eighths of the whole thickneſs, and the remainder for the ſheave-hole. The tenons to be two inches ſquare, one in the middle, and one at each end; and the ſheave-holes the thickneſs of the rope longer than the breadth. The back of the block is divided into three parts, and one-third on each ſide bearded down to one-third the thickneſs of the back at each edge.

They are then let in to the topmaſt-head with mortiſes, and holes are bored through the centre of the ſheave-holes, that the ſheaves may work on the bolts which faſten them to the maſt-head. The bolts are ſaucer-headed, and forelocked on a ring. The blocks are not faſtened until the topmaſt is in its place through the hole of the lower cap.

The ſheave-holes are coppered, to prevent the blocks chafing with the rope. Moſt ſheave-holes in yards, &c. are the ſame, or ſometimes guarded on the edges by a thick wire driven into the ſolid.

Mizen-topmaſts are trimmed as the former in proportion, but differ thus: viz. They have no block below the heel, only a ſquare heeling at the butt, and a ſheave-hole cut fore and aft through the hounds, one-third its length below the ſtops, for the topſail tye, in all ſhips.

If a long pole-head, it is rounded above the ſtops, and a ſheave-hole cut through, fore and aft, once and a half its length above the ſtops, for the ſtayſail haliards, and another ſheave-hole, half its length below the head, for the mizen topgallant tye. Laſtly, a ſquare tenon is made on the upper part, as large as the head will admit, for the truck, which has a mortiſe the ſize of the tenon cut out in the middle, and driven on tight to its thickneſs.

Topgallant-maſts trim as the mizen-topmaſt with a pole-head, except when royal-maſts are uſed, and then like a mizen-topmaſt with a ſquare head.

Royal-maſts are trimmed ſimilar to topgallant maſts or flagſtaffs.

Tryſail-maſts ſtop upon deck cloſe abaft the mainmaſt of ſnows, and their heads fix underneath the aftſide of the top. At the head they are trimmed round to three-fourths the diameter at the heel.

Boats maſts as before deſcribed.

BOWSPRITS. Bowſprits made of two trees, are coaked together in the middle, and bolted as maſts, and lined to the ſize the fore and aft way from a middle-line on the 'thwartſhip ſide, and hewed plumb: then canted up, and a middle-line ſtruck along the upperſide, and the eight-ſquare ſet off. The ſame on the oppoſite ſide, and trimmed as the maſt. Then canted down, and the fiſhes coaked on to the 'thwartſhip ſides, faſtened and lined to the bigneſs athwartſhips, then eight-ſquared, ſixteen-ſquared, and rounded, except the ſquare at the outer end, which haunches from thence into the round. Then ſtation the hoops thus: five to be in the lower drift of a firſt rate ſhip, and four in a ſecond and third, from the heel to the bed, and nine in the upper drift of the firſt rate, and eight in the ſecond and third, from the bed to the ſquare at the outer end, and two mould-hoops on the ſquares of each rate. The hoops are then driven on to their ſtations as before. Place the hoops clear of the tenon at the heel, the bed, the gammoning, and tenon at the outer end.

Bowſprits made of ſingle trees are ſixteen-ſquared and rounded to the ſquare at the outer end as before. Thoſe left ſquare within the bow are ſixteeen-ſquared, and rounded from thence to the outer end, and planed ſmooth and fair. The former have two or three hoops driven on the heel; the latter only one, let into the heel.

The bowſprit cap is next trimmed, and let on the outer end with a tenon. The length of the cap is five times the diameter of the jib-boom; the breadth, twice the diameter of the jib-boom, and half the diameter of the jack-ſtaff; and the thickneſs four-ninths the breadth.

Set off what the bowſprit ſtives in the thickneſs of the cap before the length.

The fore and aftſides of the cap are trimmed or ſawed ſtraight and out of winding, and are of a parallel thickneſs. The 'thwartſhip ſides are cut ſquare and parallel to the breadth. The ends are cut ſquare athwart, and fore and aft to the ſtive of the bowſprit. Then a line is ſtruck lengthways on the fore and aft ſide the cap near the middle, leaving half the diameter of the jack-ſtaff on the ſtarboard ſide. Then ſet off, parallel from the upper part of the cap, once its thickneſs, for the upperſide of the hole that the jib-boom ſlides through. Then ſet off the diameter of the jib-boom on each ſide ſquare from the upperſide of the hole and parallel, and race it acroſs on the fore and after ſides. Then ſet off half the diameter of the jib-boom on each ſide the middle-line on the cap; and ſweep the hole to an oval. In ſetting off the hole, three-quarters of an inch is to be added for leathering.

From the under part of this hole, ſet down two-ſevenths the diameter of the bowſprit, and ſquare it acroſs, for the upper part of the hole, which fits the tenon made on the outer end of the bowſprit thus; three-fourths the diameter is ſet off from the middle-line athwartſhips, and ſeven-eighths fore and aft from the upperſide at the thickneſs of the cap within the end, and half the remaining bigneſs of the bowſprit is ſet down from the upperſide at the outer end, and tapers half an inch in the length each way.

Six bolts, one inch and an eighth to ſeven-eighths of an inch diameter, are driven through the cap, from the 'thwartſhip ſides, and parallel to the breadth; the four upper ones to be eye-bolts, and the two lower ones ſtraight: the upper eye-bolt to be driven in the after hole from the ſtarboard ſide, and the others from each ſide alternately, and clenched on a ring; another eye-bolt is driven through the middle of the cap, from the aftſide, between the round hole and the upper part; the eye to ſtand up and down. Another eye-bolt is driven from the foreſide at the lower edge, after the cap is fixed on the bowſprit, and belays with a forelock in the middle of the ſquare part on the aftſide, and a ſtraight bolt is driven athwartſhips, in the middle of the ſquare hole parallel to the aftſide, through the tenon, and clenches on a ring. A groove is made, for the jack-ſtaff, from the upper-

ſide of the cap to the middle of the ſquare hole on the ſtarboard ſide; the groove to be the diameter of the ſtaff in breadth, and half in depth. The ſtaff is confined, near the upper part of the groove, by an iron ſtrap, made with a ſemi-circle in the middle, to embrace the ſtaff, and a hole in one end for a ſtaple, and a mortiſe in the other, that goes over a toggle-bolt, and is there retained by an iron pin. The heel of the ſtaff reſts in a hole made in the ſtarboard bee.

BEES are made of elm plank. The length, twice and a quarter the given diameter of the bowſprit; the breadth, two-thirds the diameter; and the thickneſs, one-fourth the outer diameter of the bowſprit at the inner edge, and tapering from thence to four-fifths that thickneſs at the outer edge, on the underſide. The outer ends are left ſquare; the projection of the cap and the inner ends, one-third the breadth; and then turned off with a hollow and round. About one-fourth within the ends are bored holes, large enough to reeve the fore topmaſt and preventer-ſtays. The hole at the outer end of the ſtarboard bee is made long enough to anſwer with the ſheave-hole in the block underneath, and with the hole at the inner end of the larboard bee. The other holes are uſed when wanted. Seamen ſay the ſtays would lead clearer, if the ſheave-holes in the bee-blocks were at the contrary ends. In the outer end of the ſtarboard bee is cut a ſemi-circle, to anſwer the groove in the cap, for the heel of the jack-ſtaff.

The bees are let into the outer ends of the bowſprit, one-third their thickneſs, and one on each ſide; their foremoſt ends are fayed cloſe againſt the aftſide of the cap, the upperſides well with the upperſide of the bowſprit, and their outer edges raiſed above a level, three inches in every foot in the breadth; then bolted through the head of the bowſprit with four bolts, one inch diameter, in large ſhips; and with three bolts, ſeven-eighths of an inch diameter, in ſmaller ſhips. The holes are bored parallel to the upperſide in the middle of the outer edge, and the bolts clenched on a ring on the oppoſite ſides of the bowſprit, one at each end, clear of the holes. The others bolt in the middle between the holes.

Bee-blocks are of elm, ſeven-ninths the length of the bee; the depth, two inches for every foot in the length, and the thickneſs, ſeven-eighths the depth. They are fitted with a ſheave in the foremoſt end of one and after end of the other. The ſheave-hole, two-ſevenths the length of the block, and half the length within the end, and one-fourth the length in breadth. In the other end of the block is cut a ſquare mortiſe, under the other hole in the bee. The blocks are fayed to the ſides of the bowſprit and underſide of the bees, and bolted with two bolts, one through each ſheave-hole, and belay on a ring with a forelock. The bolts ſerve as an axis for the ſheaves.

The tenon at the heel is ſimilar to that at the head, and is ſeven-twelfths the given diameter athwartſhips, and two-thirds up and down, and tapers one inch in the length, which is one-third the given diameter.

SADDLES. The ſaddle for the jib-boom is one-ſixth the given diameter in thickneſs, and one-half in length, and fayed upon the bowſprit, one-third of the boom within the outer end, and a ſeat made upon the upper part, for the heel of the boom to lie on, clear of the ſaddle for the ſpritſail ſlings, and is nailed to the bowſprit, after the bowſprit and jib-boom are rigged.

The ſaddle for the ſpritſail ſlings is one-eighth the given diameter in thickneſs, and fays upon the bowſprit, before the boom-ſaddle, and is made of a parallel breadth to its thickneſs, and chamfered on the aftſide at the upper part, and nails upon the bowſprit about one-fifth the length within the outer end, and leaded on the foreſide one-half the circumference of the bowſprit upon the ſame.

The ſaddle for the running-rigging is ſimilar to the above, and nails on the bowſprit juſt without the gammoning, but not till the bowſprit is rigged. It has ſeveral holes bored through fore and aft, through which the rigging is led clear into the bow.

CLEATS are made for ſtops againſt the collars and gammoning, and are nailed on when rigging. The cleats againſt the collars to be in length one-half the given diameter; and one-fourth the length thick and broad. The cleats againſt the gammoning to be two inches ſhorter than the collar cleats, and the ſame in proportion. The ends are cut bevelling to the direction of the rope.

Laſtly, a woolding, the ſame as on the maſt, is fixed juſt within the ſquare at the outer end.

The bowſprits of ſmall veſſels, as cutters, &c. commonly have an iron hoop let on, which nails to the outer end; with an eye on each ſide, and one in the middle, on the upperſide, and a ſheave-hole cut through the inner and outer ends.

YARDS. After yards are ſawed as directed, they are completed thus: thoſe that ſcarf together in the middle have the ſcarf and haunches trimmed ſtraight, and out of winding, on the inſide, and a line ſtruck along the middle, and a chain-coak ſet off, two feet four or two feet ſix inches long, and one-third the diameter broad; and the butts ſquared acroſs and down the ſides. The coaks are raiſed one inch and a quarter at the butt, and ſunk to the ſame on the other ſide the middle towards the arm: the other half is then canted thereon, ſet ſtraight and out of winding, and fayed as the maſts, and bolted together fore and aft through the middle, in the butt of every coak; the heads are driven from the thinneſt part of the ſcarf and clenched on a ring, and the haunches nailed.

The yard is then ſixteen-ſquared, and rounded from one quarter on each ſide the ſlings to the outer ends, except on the aftſide, which muſt remain ſquare two quarters on each ſide the middle. The whole is then planed fair and ſmooth, and the ſcarfs caulked their length and hooped, one hoop over the butt of each ſcarf, one in the middle of each haunch, and one between every bolt: then a fiſh of fir, two inches thick, and the ſame length and breadth as the ſquare on the aftſide, is fayed and nailed cloſe over all the hoops.

Yards lengthened at the quarters have their ſcarfs trimmed ſtraight and out of winding. The ſcarf on the arm-piece is to fit the tongue on the yard, then to be driven on, ſet cloſe, and bolted with three bolts, five-eighths to three-quarters of an inch diameter, and the ends of the ſcarf nailed. The yard is then rounded and planed ſmooth, and four hoops driven over the ſcarf, one over each butt and two equally between.

Main and fore yards, made of ſingle trees, are ſixteen-ſquared, and rounded as the former. In merchant-ſhips, they have ſheave-holes in their arms for the topſail-ſheets, and are left ſquare the length of the ſheave-hole: but this method weakens the yard, and ſhould not be adopted. Obſerve, ſhould the tree be crooked, to place the rounding ſide uppermoſt.

Topſail-yards, being trimmed ſixteen-ſquare, are rounded, and planed ſmooth and fair from the firſt quarter on each ſide the middle to their outer ends, and a ſheave-hole cut from the upperſide, its length within each outer end, for the reef-tackles. In ſome merchant-ſhips, holes are cut within the cleats, for the topgallant-ſheets, but it is better avoided, as it weakens the yard-arms.

Topgallant-yards, royal-yards, croſs-jack-yards, mizen-yards, ſprit and ſprit-topſail yards, ſtudding-ſail and driver yards, are trimmed eight-ſquare, ſixteen-ſquare, and then rounded, and planed fair and ſmooth from end to end throughout the length.

BATTENING YARDS. Main and fore yards, main, fore, and mizen, topſail yards, have oak battens nailed on their ſquares, nearly the ſame length and breadth, and one inch to three-quarters

of an inch thick; their ends rounded, and ſnaped with a duck's bill, and the edges chamfered. The foreſides have no battens.

CLEATING OF YARDS. The fling-cleats, nailed on the foreſide of main and fore yards, are once and a quarter the diameter of the yard in length, with a ſhoulder one-third its length. The breadth one-fourth the length. The thickneſs two-thirds the breadth, and nailed once the diameter on each ſide the ſlings. They are made of elm.

Stop-cleats nail within the arms, on the fore and after ſides, one inch and a half to every yard in the length, and are half the diameter of the yard in length. The breadth one-fourth the length; the thickneſs two-thirds the breadth. Merchants yards have their cleats ſometimes raiſed from the ſolid; ſome are made of oak, others of elm.

Topſail-yards have ſtop-cleats nailed on the foreſide of the yard, once the diameter on each ſide the ſlings. Thoſe within the arms, on the fore and after ſides of the main and fore topſail yards, three inches to every yard in the length, and mizen topſail yards two inches and a quarter within their outer ends, or arms.

Topgallant-yards the ſame as topſail-yards.

Royal-yard cleats, are once the diameter on each ſide the middle aſunder, and twice their length within at the arms.

Croſs-jack-yards have ſtop-cleats nailed on the foreſide of the yard half the diameter on each ſide the ſlings. Thoſe at the arms one inch and a half within their outer ends to every yard in length, and nailed on the fore and after ſides.

Mizen-yards have ſtop-cleats nailed once the diameter aſunder on the ſtarboard ſide, and once and a half the diameter below the middle of the yard: thoſe at the peek, or outer end, once the diameter within.

Sprit and ſprit-topſail yards have ſtop-cleats nailed on their underſides; the ſpritſail-yard once the diameter on each ſide the ſlings; the ſprit-topſail-yard half the diameter on each ſide: thoſe at the arms one inch and a half within their outer ends, to every yard in the length; and they nail on the fore and after ſides, contrary to thoſe at the ſlings.

Studding-ſail and driver yards have ſtop-cleats, nailed once the diameter aſunder, at one-third the length of the yard from the inner end. Thoſe at the arms twice their length within.

Boats yards cleats once the diameter aſunder at the ſlings; ſome in the middle, others at one-third from the end, ſuch as lugs, lateen, and ſettees, and the length of the cleat within at the arms.

Yards are fitted at their outer ends for rigging out ſtudding-ſails. Main and fore yards have four boom-irons; one on each of the outer ends, the others at one-third the length of the boom within. The outer boom iron is compoſed of a ring, a neck, and ſtraps.

The ring, through which the boom ſlides, is the ſame diameter in the clear as its topmaſt ſtudding-ſail boom; breadth, three-eighths the diameter, and five-eighths to three-quarters of an inch thick. In one ſide a lignum vitæ roller is fitted, one-third in length the diameter of the boom-ring.

The neck is ſquare, and connects the ring to the ſtraps, each one inch longer than the diameter of the ring, and one-fourth its length in ſize.

The ſtraps are made one inch and a quarter in length to every three feet of the yard. The breadth, once and a half the breadth of the ring. Thickneſs at the inner part, three-eighths of an inch: they increaſe in ſubſtance towards the neck, and are made to the ſhape of and let into the yard-arm its thickneſs. Two holes are punched through the ſtraps, for bolts, the ends made round, and holes

punched. Two hoops are made the ſize of the yard-arm, one cloſe to the end, the other nearer the neck.

Inner boom-irons are made after the ſame proportion as the outer ones, but differ in ſhape. The ſtraps are made to compaſs the yard at one-third the length of the topmaſt ſtudding-ſail boom, within the end, and the ring is ſeparated from the ſtraps by a collar; the upper part of the ring opens with a hinge on one ſide, and the heel of the boom is laid therein, and confined by a bolt paſſing through eyes oppoſite the hinge, which is retained by a ſpring-forelock through the point.

Boom-irons fix on the yards thus: the rings are parallel with the axis of the yard, in a ſtraight direction with a line ſtruck upon the yard, in the middle of the ſquare, between the upper and fore ſide. The outer boom-irons let in their thickneſs at each outer end of the yard, and are bolted through, clenched, and nailed; the two hoops are driven on tight, and ſtopt with a nail on each ſide. The inner boom-irons have their ſtraps made hot, and encircle the yard at one-third the length of the topmaſt ſtudding-ſail boom; they are nailed through holes in the ſtraps, and oakum twiſted round their heads to prevent their flying off.

Boom-irons on the yard-arms of ſhips in the merchant-ſervice differ much in ſhape. The ring the boom ſlides through is connected by a collar to a ſquare hoop, that lets on, and nails to the yard-arms, they being left ſquare; and ſometimes a round hoop to the ſize of the yard-arm. Others have a ſtraight neck, projecting from ſtraps, with a ſhoulder in the middle of the neck, and the part without left ſquare. The boom-ring has a ſhank on the under part, with a mortiſe that fits the neck, and is there faſtened by a ſcrew-nut or a ſpring-forelock that goes on the neck next the ring.

Topſail yards, main and fore, commonly have boom-irons at their outer ends, like the lower-yards in merchant-ſhips; in the navy they are moſtly fitted with a boom-ring, and a ſprig-eye-bolt driven in the middle of their ends, parallel to its axis, and an iron hoop let in its thickneſs and breadth, and nailed, to prevent ſplitting the yard-arm. Yards that have no inner boom-irons have ſaddles for the heel of the boom.

Topgallant yards, main and fore, mizen yards, ſprit and ſprit-topſail yards, have their arms fitted with a ferrule-hoop, and ſprig-eye-bolts, as the topſail yards.

Mizen topſail and topgallant yards have hoops let on their outer ends, but no eye-bolts.

Driver yards have a ſheave-hole cut through the outer end, and a hoop and eye-bolt.

BOOMS. Booms are driver, jib, and ſtudding-ſail, in ſhips; and main-boom, in cutters, ſloops, &c.

Driver-booms have their diameters ſet off from a ſtraight line ſtruck along the middle, like a topſail yard. The given diameter in the Table of Dimenſions is ſet off in the middle, and at the firſt quarter, on each ſide, forty forty-one parts of the diameter in the middle; at the ſecond, eleven-twelfths; at the third, five-ſixths; and, at the ends, two-thirds. They are then lined to that bigneſs, and trimmed like the topſail-yard.

The inner end is commonly fitted with jaws, made of oak, that embrace half the diameter of the maſt. The inner part is one-fourth of what is left on each ſide, and from thence breaks in fair, to the ſize of the inner end of the boom, to which it ſcarfs with a tongue two feet long, trimmed in the end of the boom, rounded, and then faſtened with bolts, hoops, and nails, at the ends. One and ſometimes two holes are bored through the middle of each jaw, fore and aft, for the parrel that confines it to the maſt, and the ſweep is leathered.

An eye-bolt is driven through the middle from the upperſide, between the ſweep and the ſcarf, and clenched on a ring underneath, for confining the tack of the ſail. A ſheave-hole is cut through its length within the outer end of the boom for the ſheet; and on the outer end is let on a hoop, and an eye-bolt driven in the middle of the end parallel to its axis.

Sometimes an iron ſtrap with an eye is fitted on the inner end, and faſtened with bolts and hoops, and nailed at the ends. The eye of the ſtrap is confined to a groove, by a pin in a hoop or ſtrap round the maſt.

Commonly, in the merchant-ſervice, an iron hoop is let on the inner end, and an iron hook, or neck, driven in the middle, parallel to its axis, that hooks into an eye in a hoop, or a ſtrap round the maſt, and it is mouſed or forelocks through a hole, to prevent its lifting.

JIB-BOOMS have a ſtraight line ſtruck along the middle, and the length ſet up from the butt, and one-third that length for the cap. From thence to the outer end is divided into four quarters, and the given diameter (in Tab. Dimen.) is ſet off at the cap, and forty forty-one parts that diameter at the firſt quarter; eleven-twelfths at the ſecond; five-ſixths at the third; and two-thirds at the outer end. They are then lined to that ſize, and hewed plumb; then ſquared and eight-ſquared, and three times and a half the diameter ſet up from the heel, and from thence rounded to the outer end. Let a ſtop be made from the end once and a half the diameter of the boom, and a ſheave-hole half its length within the ſtop from the upperſide, for the outhauler, and another ſheave-hole, once and a half the diameter from the heel for the top-rope, be made through the middle of the ſtarboard ſquare, next the upperſide, and a hole bored through between that and the heel, the ſame ſize, for laſhing down the heel.

STUDDING-SAIL BOOMS trim alike, from a ſtraight line ſtruck along the middle. The length is ſet up from the heel, and the given diameter in the Table of Dimenſions ſet off at the heel, and at one-third the length, and lines parallel to the middle-line, and from thence to two-thirds the given diameter at the ends, and rounded as before.

The lower ſtudding-ſail booms have an iron hoop let on the inner end, and a hook driven in the middle of the end, parallel to its axis, and a hole bored through the outer end the diameter within.

Top and topgallant ſtudding-ſail booms have a hole bored through the end.

Main booms for cutters, ſloops, &c. have a ſtraight line ſtruck along the middle, and the length ſet up from the butt; the length from the maſt to the ſtern is then ſet off, for the ſtation of the main-ſheet. Then, between the ſheet and inner end, divide four quarters; and between the ſheet and outer ends two equal parts; and ſet off the given diameter (in the Table of Dimenſions) at the ſheet; and forty forty-one parts of that diameter at the firſt quarter; eleven-twelfths at the ſecond; ſeven-eighths at the third; and two-thirds at the inner end, and between the ſheet and outer end eleven-twelfths, and three-fourths at the outer end. The diameters are ſet off, and the boom lined and rounded, as the driver boom, and finiſhed with jaws at the inner end.

This boom is leathered its diameter on each ſide the ſheet, and comb-cleats nailed over the ſtrap of the block. Without the ſheet are holes bored through for the reef-pendants, or notches underneath, made from the ſolid, and a ſheave-hole, hoop, and eye-bolt, at the outer end, as the ſhip's driver-boom.

GAFFS have their diameters ſet off from a ſtraight line, ſtruck along the middle, and their lengths within eighteen inches ſet up from the butt; then ſet up four feet for ſcarfing on the jaws, and there ſet off the given diameter in the Table of Dimenſions; and divide from thence to the end into four quarters; and ſet off forty forty-one parts of the given diameter at the firſt quarter; eleven-

twelfths at the fecond; four-fifths at the third; and five-ninths at the outer end. They are then lined to that fize and rounded, as before. The jaws are made and finifhed fimilar to the booms; but, owing to the gaffs being topped fo much above a level, the jaws have a great bevelling. At the inner part, they have alfo an eye-bolt, driven through from the upper fides, and clenched underneath for the throat haliards, and one from the underfide for the nock-earing, fecuring the fail and throat downhauler, and fometimes a fheave-hole cut through on each fide, for the throat brails.

A hoop is let on the outer end, and an eye-bolt driven in the middle parallel to its axis, and cleats nailed on the 'thwartfhip fides, the diameter within the outer end, and a fheave-hole cut through from the upperfide within the cleats.

TOPS. The dimenfions of tops are, their breadths athwartfhips, one-third the length of their topmafts; their length fore and aft, three-fourths the breadth; and the fquare hole athwartfhips two-fifths the breadth of the top; and fore and aft thirteen-fourteenths the breadth; and the aftfide of the hole one-fifth the length of the top, from the aftfide of the platform, and placed in the middle athwartfhips.

Tops are made thus: the platform of clofe tops is made of three inch deals, down to a third-rate fhip, of two inches and a half to a fourth and fifth rate, and of two inches for all under, in the royal navy. The deals are fcarfed together half their thicknefs from the fize of the fquare hole each way to the whole fize of the top, and the edges fayed clofe together. The aftfide to be ftraight, and the 'thwartfhip fides fquare from thence, at the breadth, to the aftfide of the foremoft crofs-tree, where the fore part breaks in with an elliptical curve. After the top is trimmed to its dimenfions and the fcarfs well nailed together, a rim of elm board (one inch and an eighth thick, in large, and one inch in fmall fhips, and from eight to feven inches broad, except the mizen tops of fmall fhips, which are only fix inches) is nailed on the upperfide, to overhang the edge all round, four inches in large, three inches and a half in fmall, and only three inches on mizen tops of fmall fhips. Then ftation the timbers, which are made of elm plank, from four to two inches thick, according to the fize of the top, and moulded to the fame depth on the rim: to be four in number on each 'thwartfhip fide, equally fpaced between the aftfide and breaking in of the fweep, and feven or eight between them on the fore part, and one lefs on the aftfide. Between the middle timbers on the 'thwartfhip fides are cut two mortifes for the futtock-plates, as far afunder as the timbers will admit, and one on each fide them, the fame diftance, and four inches and a half within the edge, over which is faftened an iron plate with mortifes punched through to anfwer the above holes; then fay the timbers clofe to the top and elm rim on their under fides, from the projection of the rim to the fquare hole, to taper on the upperfide, within the rim, with a hollow to wear off to nothing at the fquare hole, and they are nailed through the top, with two nails in each breadth of deal, and clenched on a rove. Between the timbers are fayed fir fillings, of the fame thicknefs and nine inches broad, on the 'thwartfhip fides, and tapering from thence to half that breadth round the fore part; they nail as the timbers, and mortifes are cut through for the futtock-plates, and chamfered on the infide round the fore part of the top. On the aftfide over the timbers is a gunwale, made with elm board, eleven or twelve inches broad, and as many eighths of an inch in thicknefs, in large fhips, (and in proportion for fmaller,) and it is nailed through the timbers in each edge as before, and four fquare mortifes cut through that and the rim for the rail ftantions. On the 'thwartfhip fides, within the fillings, is fayed and fcored down over the timbers a chock of elm, eight inches broad, and three times deeper than the timbers, and three or more holes bored through, one inch and a half or two inches in dia-

meter, in the middle between the mortifes, for the futtock-plates, for fixing the fwivels, and a fquare iron plate, half an inch thick, let in over the holes. The chocks are nailed through the timbers as before. The ftantions on the aftfide are from two to three inches fquare, and tenon at the heel into mortifes in the gunwale and through to the underfide, and at the head into the underfide of the rail, which is the breadth of the top in length, and as much as the ftantions are in thicknefs, and one inch more in depth. The ftantions are trimmed eight-fquare in the middle, and the rail rounded on the upperfide; the whole is well fecured together, when the top is up in its place.

Yachts and fmall veffels often have iron rails and ftantions on the aftfide of their tops, for neatnefs.

Battened or open tops have the treftle and crofs trees framed together, and a rim of elm board, fimilar to the former, nailed round the extremities. On each fide the maft head, parallel with the treftle-trees, to the fize of the fquare hole, are fcored into the crofs-trees, pieces the fame in fize, and two more on each fide athwartfhips, fcored into the latter pieces, and lapped underneath the rim, and well nailed thereto; then a cant of oak, fimilar to the fir fillings, on the fore part of the former top, is fayed and nailed to half the breadth of the rim, and kept well with the outfide; then oak battens, one inch or feven-eighths thick, and four or fix inches broad, are fitted fore and aft within the cant, except over the fquare hole, about their breadth afunder, and are fecurely nailed to the rim, crofs-trees, and crofs-pieces.

N. B. All battened tops are made fimilar to the above.

DAVITS for fifhing the anchor to be, in length, three-tenths the breadth of the fhip, and fquare at the inner end, one inch to every foot in the length, and at the outer end one inch lefs than the inner end, and trimmed thus: viz. After they are fquared to the above fize, they are eight-fquared, leaving them fquare at the inner end, three-fourteenths the length, and a ftop of one inch and a half to two inches made at the outer end, its diameter within the end. Three eye-bolts, of one inch and a quarter to feven-eighths of an inch diameter, are driven through within the ftops, one from the upperfide, for the maft-head, guy, or topping-lift, and one on the fore and after fides for the guys. The former is well clenched on an iron plate, let in the underfide, the others on a ring. The heel is fnaped to half its depth, the up and down way, to fay to the fhip's fide, and upperfide of the fore channel, and a large elm cleat, four inches thick, is nailed to the fide over the heel to prevent its rifing, and another upon the upperfide of the channel to prevent its flipping.

FIRE BOOMS trim as lower ftudding-fail booms, the fame for fize, and two-thirds their length. The inner end is fitted with a hook, the outer end with a forked iron, driven in the middle parallel with its axis, and a hoop driven on to prevent flipping.

THE FOLLOWING METHODS ARE TAKEN, IN FIXING MASTS, IN THE ROYAL NAVY AND MERCHANT SERVICE.

AFTER the maft is raifed by means of the fheers, the lower end is fixed; it is tenoned into the upperfide of a large block of oak timber, called a ftep, fecured acrofs the keelfon.

The topmaft is attached and fecured to the head of the lowermaft by a cap, treftle-trees, and fid.

Between the lower-maſt-head and foremoſt croſs-tree, is a ſquare ſpace, bounded on each ſide by the two treſtle-trees; perpendicularly above which is the foremoſt hole in the cap, and the head of the lowermaſt is ſolidly fixed in the other hole.

The topmaſt is erected by the top-rope, which raiſes it to the head of the lowermaſt, and the upper end of the topmaſt is guided and conveyed through the holes between the treſtle-trees and cap.

When the topmaſt is raiſed to its proper heighth, the block or ſquare part is fidded on the treſtle-trees, by a bar of wood or iron, called a fid, which is driven through a hole athwart the treſtle-trees; and, upon the topmaſt, in the ſame manner, the topgallant-maſt is placed at the head of the topmaſt, and the royal-maſt upon the head of the topgallant-maſt.

THE FOLLOWING PROPORTIONS FOR THE HEIGHTH OF MASTS ARE THOSE BY WHICH SHIPS AT PRESENT ARE MASTED IN THE ROYAL NAVY.

The length of the lower deck and extreme breadth being added together, the half is the length of the main-maſt.

The length of the lower deck of a 74 gun ſhip is 176 feet. Breadth extreme 48 feet 8 inches; added together, they make 224 feet 8 inches; the half, or 112 feet 4 inches, is the length of the main-maſt; which being determined, the other maſts, yards, &c. bear the following proportions.

Fore-maſt, $\frac{8}{9}$ of the main-maſt.

Mizen-maſt, $\frac{6}{7}$ of the main-maſt.

In Sloops, the mizen-maſt, $\frac{3}{4}$ of the main-maſt.

Main-topmaſt, $\frac{3}{5}$ of the main-maſt.

Fore-topmaſt, $\frac{8}{9}$ of the main-topmaſt.

Mizen-topmaſt, $\frac{3}{4}$ of the main-topmaſt.

Sloops mizen-topmaſt, $\frac{5}{7}$ of the main-topmaſt.

Topgallant-maſt, $\frac{1}{2}$ the length of the topmaſt.

Bowſprits of 80 guns and upwards, $\frac{7}{11}$ of the main-maſts.

Bowſprits of 74 gun ſhips and under, $\frac{3}{5}$ of their main-maſts.

The diameters in proportion to the length, in the royal navy, are as follow: viz.

The main and foremaſts of ſhips of 100 to 64 guns incluſive, are one inch in diameter at the partners to every yard in length. Ships of 50 to 32 guns incluſive, $\frac{9}{10}$ of an inch to every yard in length. And ſhips of 28 guns and under, $\frac{7}{8}$ of an inch to every yard in the length.

The main-maſt of brigs to be one inch to every yard in length, and the foremaſt $\frac{9}{10}$ of the diameter of the main-maſt.

Maſts of cutters to be $\frac{3}{4}$ of an inch in diameter to every yard in length.

The mizen-maſts of ſhips of 100 to 64 guns, incluſive, $\frac{3}{5}$ of the diameter of the main-maſt; 50 gun ſhips and under, $\frac{2}{3}$ of the diameter of the main-maſt.

Diameter of the main and fore topmaſts, one inch to every yard in the length of the fore topmaſt.

Diameter of the mizen-topmaſt, $\frac{7}{10}$ of the diameter of the main-topmaſt.

Diameter of the topgallant-maſts, one inch to every yard in their lengths.

Diameter of the royal-maſts, $\frac{2}{3}$ of the diameter of their topgallant-maſts.

Bowſprits of ſhips of 100 to 64 guns, incluſive, two inches leſs than the diameter of the main-maſt. In 50 gun ſhips and under, the ſame diameter as the main-maſt.

In the merchant-ſervice the proportion of maſts and yards are variable; therefore Tables of Dimenſions for veſſels of different tonnages are ſubjoined.

PROPORTIONAL LENGTHS OF YARDS, IN THE ROYAL NAVY.

Main-yard, $\frac{8}{9}$ of the main-maſt.
Fore-yard, $\frac{7}{8}$ of the main-yard.
Mizen-yard, $\frac{6}{7}$ of the main-yard.
Main-topſail-yard, $\frac{5}{7}$ of the main-yard.
Fore-topſail-yard, $\frac{7}{8}$ of the main-topſail-yard.
Mizen-topſail-yard, $\frac{2}{3}$ of the main-topſail-yard.
Topgallant-yards to 74 gun ſhips, $\frac{2}{3}$, all under, $\frac{3}{5}$, of their topſail-yards.
Royal-yards, $\frac{1}{2}$ of the topſail-yards.
Croſs-jack-yard, the ſame as the fore-topſail-yard.
Spritſail-yard, the ſame as the fore-topſail-yard.
Spritſail-topſail-yard, the ſame as the fore-topgallant-yard.
Studdingſail-yards, $\frac{4}{7}$ of their booms.
Driver-yard, the ſame as the fore-topgallant-yard.

PROPORTIONAL DIAMETERS OF YARDS.

Main and fore yard, at the ſlings, $\frac{7}{10}$ of an inch to every yard in the length.
Mizen-yard, $\frac{2}{3}$ of the diameter of the main-yard.
Topſail-yard, $\frac{5}{8}$ of an inch to every yard in the length.
Topgallant-yard, $\frac{6}{10}$ of an inch to every yard in the length.
Royal-yards, $\frac{1}{2}$ the diameter of their topſail-yards.
Spritſail-yard, the ſame diameter as the fore-topſail-yard.
Spritſail-topſail-yard, the ſame diameter as the fore-topgallant-yard.
Studdingſail-yards, one inch in diameter to every 5 feet in the length.
Croſs-jack-yard, the ſame diameter as the fore-topſail-yard.
Driver-yard, the ſame diameter as the fore-topgallant-yard.

PROPORTIONAL LENGTHS OF BOOMS.

Lower ſtudding-ſail booms, $\frac{5}{9}$ of the main-yard.
Top ſtudding-ſail booms, $\frac{1}{2}$ the length of the yards they go on.
Flying jib boom, $\frac{5}{7}$ of the bowſprit.
Driver boom, the ſame length as the main-topſail-yard.

PROPORTIONAL DIAMETERS OF BOOMS.

Studding-ſail booms, one inch to every five feet in the length.
Flying jib booms, $\frac{7}{8}$ of an inch to every yard in the length.
Driver boom, the ſame as the fore-topſail-yard.

PROPORTIONAL LENGTHS OF GAFFS.

Length of the gaffs, $\frac{5}{8}$ of their reſpective booms.
Diameter of the gaffs, the ſame as their booms.

PROPORTIONAL LENGTHS OF STAFFS.

Length of the enſign-ſtaff, $\frac{1}{3}$ of the main-maſt, above the taffarel.
jack-ſtaff, $\frac{1}{2}$ the length of the enſign-ſtaff above the tafferel.
Diameter of the enſign-ſtaff, half an inch to every yard in the length.
jack-ſtaff, $\frac{3}{4}$ of an inch to every yard in the length.

PROPORTIONS OF MASTS, YARDS, &c. FOR SLOOPS, SMACKS, AND HOYS.

PROPORTIONAL LENGTHS.

Maſt and topmaſt in one, thrice and $\frac{3}{4}$ the breadth of the veſſel.
Maſt to the rigging-ſtop or hounds $\frac{3}{4}$ the whole length.
Maſt and topmaſt to the ſtop of the topmaſt $\frac{40}{41}$ of the whole length.
Topgallant-maſt to the rigging-ſtop $\frac{4}{7}$ of the length of the maſt.

Boom $\frac{2}{3}$ of the maſt.
Gaff $\frac{3}{5}$ of the boom.
Spread-yard $\frac{5}{8}$ of the maſt.

Croſs-jack-yard $\frac{2}{5}$ of the maſt.
Topſail-yard $\frac{4}{5}$ of the croſ-jack-yard.
Topgallant-yard $\frac{5}{6}$ of the topſail-yard.

Bowſprits $\frac{5}{9}$ of the maſt.

PROPORTIONAL DIAMETERS IN FRACTIONAL PARTS OF AN INCH TO EVERY FOOT IN LENGTH.

Maſt $\frac{1}{4}$.
Topgallant-maſt $\frac{3}{8}$.
Boom $\frac{3}{16}$.

Gaff $\frac{1}{4}$.
Spread-yard $\frac{1}{7}$.
Croſs-jack-yard $\frac{2}{10}$.

Topſail-yard $\frac{2}{10}$.
Topgallant-yard $\frac{1}{6}$.
Bowſprit $\frac{3}{8}$.

MASTS, YARDS, &c. FOR BOATS.

Long boats, ſloop faſhion, as above; but with lug-ſails as follow.

LENGTHS.

Main-maſt twice and a half the breadth of the boat.

Fore-maſt $\frac{7}{8}$ of the main-maſt.
Bowſprit $\frac{1}{2}$ of the main-maſt.

Main-yard $\frac{5}{8}$ of the main-maſt.
Fore-yard $\frac{5}{8}$ of the fore-maſt.

DIAMETERS IN FRACTIONAL PARTS OF AN INCH TO EVERY FOOT IN LENGTH.

Main-maſt $\frac{1}{4}$. | Foremaſt $\frac{1}{4}$. | Main-yard $\frac{1}{4}$. | Fore-yard $\frac{1}{4}$. | Bowſprit $\frac{5}{8}$.

LAUNCHES AND CUTTERS WITH LUG-SAILS.

LENGTHS.

Main-maſt twice and $\frac{3}{4}$ the breadth of the boat.

Fore-maſt $\frac{8}{9}$ of the main-maſt.
Main-yard $\frac{9}{17}$ of the main-maſt.
Fore-yard $\frac{9}{17}$ of the fore-maſt.

Mizen-maſt $\frac{5}{8}$ of the main-maſt.
Sprit 2 feet longer than the mizen-maſt.
Outrigger $\frac{2}{3}$ of the mizen-maſt.

DIAMETERS IN FRACTIONAL PARTS OF AN INCH TO EVERY FOOT IN LENGTH.

Main-maſt $\frac{1}{4}$. | Fore-maſt $\frac{1}{4}$. | Main-yard $\frac{1}{4}$. | Fore-yard $\frac{1}{4}$. | Mizen-maſt $\frac{1}{4}$. | Sprit $\frac{1}{7}$. | Outrigger $\frac{3}{7}$.

LAUNCHES AND CUTTERS WITH SETTEE-SAILS.

Length of the main-yard, thrice and $\frac{1}{2}$ the breadth of the veſſel.
main-maſt, $\frac{4}{7}$ of the main-yard.
fore-maſt, $\frac{17}{18}$ of the main-maſt.
fore-yard, $\frac{9}{10}$ of the main-yard.
Diameter of the maſts, $\frac{3}{8}$ of an inch to every foot in the length.
yards, $\frac{1}{4}$ of an inch to every foot in the length.

BARGES AND PINNACES WITH LATTEEN-SAILS.

Length of the masts, twice the breadth of the boat and 8 inches added.

topmasts, the length of the mast and $\frac{1}{9}$ more.

scarf to the lower-mast, $\frac{1}{4}$ its length.

Diameter of the masts, $\frac{5}{16}$ of an inch to every foot in length.

topmasts, $\frac{2}{10}$ of an inch to every foot in length.

BARGES, PINNACES, AND YAWLS, WITH SPRIT-SAILS.

Length of the main and fore masts, twice and $\frac{1}{4}$ the breadth of the vessel.

sprits, $\frac{1}{8}$ more than the mast.

Diameters of the masts, $\frac{1}{4}$ of an inch to every foot in the length.

sprits, $\frac{1}{8}$ of an inch to every foot in the length.

A FRACTIONAL TABLE OF THE PROPORTION THAT EVERY PART OF A MAST OR YARD BEARS TOWARD THE GIVEN DIAMETER IN THE TABLES OF DIMENSIONS.

	Quarters.			Head.		Heel.
	1st.	2d.	3d.	Lower part	Upper part.	—
Standing Masts that are checked, fore and aft.	$\frac{60}{61}$	$\frac{14}{15}$	$\frac{6}{7}$	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{6}{7}$
Standing Masts that are checked, athwartships.	$\frac{60}{61}$	$\frac{14}{15}$	$\frac{6}{7}$	$\frac{6}{7}$	$\frac{2}{3}$	$\frac{6}{7}$
Standing Masts that head themselves	$\frac{60}{61}$	$\frac{14}{15}$	$\frac{6}{7}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{6}{7}$
Top-masts, Gallant-masts, and Royal-masts	$\frac{60}{61}$	$\frac{14}{15}$	$\frac{6}{7}$	$\frac{9}{13}$	$\frac{6}{11}$	—
				Arms.		
Mizen-yard, Lower-arm	$\frac{60}{61}$	$\frac{11}{12}$	$\frac{3}{6}$	$\frac{2}{3}$	—	—
Mizen-yard, Upper-arm	$\frac{30}{31}$	$\frac{7}{8}$	$\frac{7}{10}$	$\frac{2}{5}$	—	—
Yards in general	$\frac{30}{31}$	$\frac{7}{8}$	$\frac{7}{10}$	$\frac{3}{7}$	—	—
Bowsprit	$\frac{60}{61}$	$\frac{11}{12}$	$\frac{4}{5}$	$\frac{5}{9}$	Outer End.	$\frac{6}{7}$
				Ends.		
Driver booms	$\frac{40}{41}$	$\frac{11}{12}$	$\frac{5}{6}$	$\frac{2}{3}$	—	—
				fo. end.	af. end.	Middle
Main booms	$\frac{40}{41}$	$\frac{12}{13}$	$\frac{7}{8}$	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{11}{12}$
Gaffs	$\frac{40}{41}$	$\frac{11}{12}$	$\frac{4}{5}$	$\frac{5}{9}$	—	—
Heeling, Standing-masts	$\frac{2}{3}$ athwartship.			—	$\frac{1}{2}$	fo.&aft.
Heeling, Bowsprits	$\frac{7}{12}$ athwartship.			$\frac{2}{3}$	up and down.	

LENGTHS OF

The cheeks $\frac{3}{7}$ if oak, and $\frac{9}{20}$ if fir, of the length of the mast.

The head of the main and fore masts, 5 inches to every yard of the mast's length.

The head of the mizen-mast, and main and fore topmasts, 4 inches to every yard of the length.

The head of the mizen topmast, and all topgallant-mast, $3\frac{1}{2}$ inche to every yard of the length.

Long pole-heads to topgallant-masts $\frac{2}{3}$ of the length of the stop, (that is, when the $3\frac{1}{2}$ inches to a yard is taken out of the whole length). Proper pole-heads to be $\frac{3}{15}$ of that length; and stump pole-heads $3\frac{1}{2}$ inch to every yard in length.

The hounds of all lower-masts $\frac{7}{15}$ of the length of the head.

The topmasts $\frac{3}{8}$ of the length of the head.

EXPLANATION OF THE PROPORTIONS IN THE FRACTIONAL TABLE.

The diameters at the quarters being given in what mast-makers call fractional parts of the diameter at the partners, or slings, observe, that the first quarter of the main-mast is $\frac{60}{61}$, that is, if the diameter at the parthers be 61, that at the first quarter will be 60: now, the diameter at the partners of a 74 gun ship's main-mast being 37 inches, we have three terms of the Rule of Three given, and thus expressed, 61 : 60 : : 37 to the product, which we shall find to be $36\frac{2}{5}$ inches.

In the Rule of Three there are three numbers given; and, if the second be multiplied by the third, and the product divided by the first, the quotient will give the fourth term, which will have the same proportion to the third that the second term has to the first.

Draw out the ſlide till 61 is againſt 60; you will then find $36\frac{3}{8}$ againſt 37 inches; ſo that $36\frac{3}{8}$ is the diameter of the firſt quarter; hence we have this general rule, when the fractional part is given, draw out the ſlide till the denominator, 61, is againſt the numerator, 60; then look for the diameter of the partners, or ſlings, 37 inches, as above, on the ſame line with the denominator, 61; and, againſt 37, the diameter at the partners, you have $36\frac{3}{8}$, the diameter of the firſt quarter; then, by uſing the ſame operation as for finding the firſt quarter, you will find the ſecond quarter $34\frac{1}{2}$, the third quarter $31\frac{3}{4}$, the head $27\frac{3}{4}$, and the upper part of the head $23\frac{1}{8}$.

It is preſumed theſe examples may ſuffice to explain the manner of notation in the preceding proportions, and likewiſe the method of working by the ſliding-rule, which may be applied to all queſtions in the Rule of Three, ſuch as meaſuring timber, plank, &c.

A TABLE OF THE VALUE OF FIR TIMBER, 1792.

MASTS OF RIGA OR GOTTENBOROUGH.

Diam. in Inch.	Leng		Value.		
Inches.	Ft.	I.	£	s.	d.
26	87	0	94	14	5
$25\frac{1}{2}$	85	6	89	19	4
25	84	0	85	4	3
$24\frac{1}{2}$	82	6	77	6	$4\frac{1}{2}$
24	81	0	69	8	6
$23\frac{1}{2}$	79	6	62	12	$1\frac{1}{2}$
23	78	0	55	15	9
$22\frac{1}{2}$	76	6	51	11	$5\frac{1}{2}$
22	75	0	47	7	2
$21\frac{1}{2}$	73	6	41	11	9
21	72	0	35	16	9
$20\frac{1}{2}$	70	6	30	17	6
20	69	0	25	18	8
$19\frac{1}{2}$	67	6	22	11	$5\frac{1}{2}$
19	66	0	19	4	3
$18\frac{1}{2}$	64	6	17	6	$0\frac{1}{2}$
18	63	0	15	7	10
$17\frac{1}{2}$	61	6	13	14	0
17	60	0	12	0	0
$16\frac{1}{2}$	58	6	11	10	$10\frac{1}{2}$
16	57	0	11	1	7

NORWAY HAND MASTS.

Hands in Circumf.	Dia. in In.	Leng		Value.		
Hands.	Inch.	Ft.	I.	£	s.	d.
16	20	66	0	30	0	0
$15\frac{1}{2}$	$18\frac{7}{8}$	64	6	12	0	0
15	$18\frac{3}{4}$	63	0	11	0	0
$14\frac{1}{2}$	$17\frac{5}{8}$	61	6	10	0	0
14	$17\frac{1}{2}$	60	0	9	0	0
$13\frac{1}{2}$	$16\frac{3}{8}$	58	6	8	5	0
13	$16\frac{1}{4}$	57	0	7	10	0
$12\frac{1}{2}$	$15\frac{1}{8}$	55	6	6	15	0
12	15	54	0	6	0	0
$11\frac{1}{2}$	$14\frac{3}{8}$	52	6	5	7	6
11	$13\frac{3}{4}$	51	0	4	15	0
$10\frac{1}{2}$	$12\frac{5}{8}$	49	6	4	2	6
10	$12\frac{1}{2}$	48	0	3	10	0
$9\frac{1}{2}$	$11\frac{3}{8}$	46	6	2	17	6
9	$11\frac{1}{4}$	45	0	2	5	0
$8\frac{1}{2}$	$10\frac{1}{8}$	43	6	1	18	6
8	10	42	0	1	12	0
$7\frac{1}{2}$	$8\frac{7}{8}$	40	6	1	9	6
7	$8\frac{3}{4}$	39	0	1	7	0
$6\frac{1}{2}$	$7\frac{5}{8}$	37	6	0	19	6
6	$7\frac{1}{2}$	36	0	0	12	0

MASTS OF NORTH AMERICA WHITE PINE.

Diam. in Inch.	Leng in Yd	Value.		
Inches.	Yds.	£	s.	d.
38	38	190	1	0
37	37	174	4	0
36	36	153	2	0
35	35	134	12	0
34	34	120	2	0
33	33	102	19	0
32	32	89	2	0
31	31	79	17	0
30	30	69	6	0
29	29	54	15	0
28	29	50	16	0
27	29	46	17	0
26	28	41	11	0
25	27	36	6	0
24	27	32	6	0
23	27	29	14	0
22	26	23	2	0
21	25	20	9	0
20	24	16	10	0
19	23	13	7	0
18	23	12	10	0

BOWSPRITS OF NORTH AMERICA WHITE PINE.

Diam. in Inch.	Leng in Yd	Value.		
Inches.	Yds.	£	s.	d.
38	25	108	12	0
37	$24\frac{1}{2}$	96	16	0
36	24	88	10	0
35	$23\frac{1}{2}$	72	3	0
34	23	64	4	0
33	$22\frac{1}{2}$	58	1	0
32	$21\frac{3}{4}$	53	4	6
31	21	48	16	0
30	$20\frac{1}{2}$	44	12	6
29	$19\frac{3}{4}$	34	15	0
28	19	29	9	0
27	$18\frac{1}{2}$	25	19	6
26	$17\frac{3}{4}$	22	0	0
25	17	19	7	0
24	$16\frac{1}{2}$	16	14	0
23	16	14	1	0
22	15	12	5	6
21	$14\frac{1}{2}$	11	0	0
20	$13\frac{3}{4}$	10	1	6
19	13	9	13	0
18	$12\frac{1}{2}$	8	16	0

YARDS OF NEW ENGLAND.

Diam. in Inch.	Leng in Yd	Value.		
Inches.	Yds.	£	s.	d.
25	35	62	0	0
$24\frac{1}{2}$	$4\frac{1}{2}$	55	0	0
24	34	48	16	0
$23\frac{1}{2}$	33	43	19	0
23	32	39	12	0
$22\frac{1}{2}$	$31\frac{1}{2}$	35	17	0
22	31	31	13	0
$21\frac{1}{2}$	30	27	18	0
21	$29\frac{1}{2}$	24	8	0
$20\frac{1}{2}$	$28\frac{1}{2}$	22	12	0
20	28	20	9	0
$19\frac{1}{2}$	$27\frac{1}{2}$	18	12	0
19	27	16	10	0
$18\frac{1}{2}$	26	13	17	0
18	$25\frac{1}{2}$	12	10	0
$17\frac{1}{2}$	25	11	8	0
17	$24\frac{1}{2}$	10	11	0
$16\frac{1}{2}$	$23\frac{1}{2}$	9	13	0
16	$22\frac{1}{2}$	8	16	0
—	—	—		
—	—	—		

BOWSPRITS of Riga or Gottenburgh Trees are $\frac{2}{3}$ the Value of Maſts of the ſame Diameter. — Fifty Feet of Fir, Oak, or Elm, Timber, make a Load.

VALUE OF SPARS.

	Size or Thickneſs.	Length.	Value.
Cant Spars — —	7 to 5 Inches, at 3 Feet 4 Inches from the Butt	36 to 33 Feet	0l. 6s. 6d. each.
Ratling Spars – —	5 to 4 Inches, at 2 Feet 8 Inches from the Butt	30 to 28 Feet	0l. 3s. 10d. each.
Boom Spars — —	4 to 3 Inches, at 2 Feet from the But	30 to 27 Feet	0l. 3s. 2d. each.
Middling Spars —	2 to 3 Inches		3l. 10s. 0d. per H.
Small Spars — —	2 Inches and under		2l. 3s. 0d. per H.

THE VALUE OF TIMBER, per Load, &c.

	£	s.	d.
Straight Oak, per Load — —	3	5	0
Elm, per Load — — —	3	0	0
Dantzick Fir, per Load — —	2	7	0
Load Baulk, per Load — —	2	0	0
Pruſſia Deals, 3 Inches thick, each —	0	17	6
Medium Pruſſia, $2\frac{1}{2}$ Inches thick, each —	0	15	0
Pruſſia Deals, 2 Inches thick, each — —	0	10	6
Ordinary Deals, 13 Feet 6 Inches long, per Doz.	1	3	3
Ordinary Deals, 11 Feet 6 Inches long, per Doz.	0	19	3
Ordinary Deals, 9 Feet 6 Inches long, per Doz.	0	17	3

IRON WORK to MASTS, &c. Materials and Workmanſhip, £1 17 6 per cwt.

VALUE OF WORKMANSHIP, PER FOOT, IN LENGTH,

For putting together and completing Masts, Yards, Booms, &c. in the Royal Navy.

☞ The intermediate Lengths are of a proportionable Price.

NAMES OF THE MASTS, YARDS, &c.	NUMBER OF GUNS.	PRICE Per FOOT. s. d. s. d.
Main Masts in Parts — —	100 to 24	17 0 to 9 0
Fore Masts in Parts — —	100 to 24	15 0 to 7 0
Mizen Masts in Parts — —	100 to 90	10 0 to 9 9
Mizen Masts lengthened —	100 to 24	3 6 to 2 0
Bowsprits in Parts — —	100 to 28	9 0 to 6 0
Main Mast, Single Tree —	64 to Sloops	5 3 to 3 0
Fore Mast, Single Tree —	64 to Sloops	4 10 to 2 10
Mizen Mast, Single Tree —	64 to Sloops	2 10 to 1 9
Bowsprit, Single Tree — —	64 to Sloops	3 0 to 2 0
Main Yard in Parts — —	100 to 50	3 8 to 2 10
Fore Yard in Parts — —	100 to 74	3 8 to 3 4
Main Yard lengthened — —	44 to Sloops	1 6 to 0 9
Fore Yard lengthened — —	100 to Sloops	2 0 to 0 9
Mizen Yard lengthened —	100 to Sloops	1 0 to 0 5
Topmast, Main — — —	100 to Sloops	2 0 to 1 3
Fore — — —	100 to Sloops	2 0 to 1 3
Mizen — — —	100 to Sloops	1 0 to 0 7
Top Gallant Mast, Main —	100 to Sloops	0 8 to 0 4
Fore —	100 to Sloops	0 8 to 0 4
Mizen —	100 to Sloops	0 6 to 0 2
Royal Mast, Main — —	100 to Sloops	0 6 to 0 2
Fore — —	100 to Sloops	0 6 to 0 2
Yards, Main — — —	64 to Sloops	1 9 to 0 10
Fore — — —	64 to Sloops	1 7 to 0 9
Mizen — — —	64 to Sloops	0 10 to 0 4
Topsail Yards, Main — —	100 to Sloops	1 0 to 0 6
Fore — —	100 to Sloops	1 0 to 0 6
Mizen — —	100 to Sloops	0 8 to 0 4
Top Gallant Yards, Main —	100 to Sloops	0 6 to 0 3
Fore —	100 to Sloops	0 6 to 0 3
Mizen —	100 to Sloops	0 5 to 0 2
Royal Yards, Main — —	100 to Sloops	0 5 to 0 2
Fore — —	100 to Sloops	0 4 to 0 2
Mizen — —	100 to Sloops	0 2 to 0 1
Cross Jack Yard — — —	100 to Sloops	1 0 to 0 6
Spritsail Yard — — —	100 to Sloops	1 0 to 0 6
Sprit Topsail Yard — —	100 to Sloops	0 6 to 0 3½
Driver Yard — — —	100 to Sloops	0 5 to 0 4
Flying Jib Boom — — —	100 to Sloops	1 0 to 0 4
Driver Boom with Jaws —	100 to Sloops	1 2 to 0 6
Driver Boom without Jaws —	100 to Sloops	0 8 to 0 4½
Gaff —— — — —	50 to Sloops	1 0 to 0 9
Lower Studdingsail Booms —	100 to Sloops	each 5 to 0 3
Main Top Studdingsail Booms —	100 to Sloops	each 4½ to 0 2½
Main Top Gallant Ditto —	100 to Sloops	each 4 to 0 2
Fore Top Ditto — — —	100 to Sloops	each 4½ to 0 2½
Fore Top Gall. Studding. Boom —	100 to Sloops	each 4 to 0 2
Lower Studdingsail Yards —	100 to Sloops	0 3 to 0 2
Main Top Ditto — —	100 to Sloops	0 3 to 0 1½
Main Top Gallant Ditto —	100 to Sloops	0 2 to 0 1
Fore Top Studdingsail Yards —	100 to Sloops	0 3 to 0 1½
Fore Top Gallant Ditto —	100 to Sloops	0 2 to 0 1
Fire Boom — — — —	100 to Sloops	0 7 to 0 2½
Ensign-Staff — — —	100 to Sloops	0 6 to 0 3
Jack-Staff — — — —	100 to Sloops	0 3 to 0 1½
Wedging Masts in the Partners — — — —	100 to Sloops { Ma.&Fore Mizen	2 6 2 0 } per Wedge
Masts of Long Boats — —	100 to Sloops	0 7 to 0 3
Bowsprits of Long Boats —	100 to Sloops	0 4½ to 0 2
Mainsail Boom — — —	100 to Sloops	0 4½ to 0 2
Mainsail Gaff — — —	100 to Sloops	0 6 to 0 3
Masts of Small Boats — —	100 to Sloops	0 3½ to 0 2
Top Masts of Small Boats —	100 to Sloops	0 2 to 0 1½
Yards, Sprits, and Outriggers —	100 to Sloops	0 1½ to 0 1¼
Half-Davits — — —	100 to Sloops	0 6 to 0 6

CUTTERS, SLOOPS, &c.	TONS.	PRICE Per Foot.
Main Mast in Parts — —	400 to 140	6 0 to 5 0
Main Mast, one Stick with Oak Cheeks — — —	400 to 100	3 0 to 2 0
Main Mast, Single Tree —	400 to 100	2 4 to 1 0
Bowsprit — — — —	400 to 100	2 0 to 0 10
Boom — — — —	400 to 100	1 6 to 0 8
Gaffs — — — —	400 to 100	each 1 4 to 8
Topmast — — — —	400 to 100	1 2 to 0 8
Cross Jack Yard — — —	400 to 100	0 10 to 0 7
Topsail Yard — — —	400 to 100	0 7 to 0 4
Top Gallant Yard — —	400 to 100	0 4 to 0 3
Squaresail Boom — — —	400 to 100	0 7 to 0 4
Squaresail Yard — — —	400 to 100	0 4 to 0 3
Mizen Mast — — —	400 to 100	0 8 to 0 5
Mizen Yard — — —	400 to 100	0 4 to 0 3
Outrigger — — — —	400 to 100	0 5 to 0 3
Jib Boom — — —	400 to 100	0 6 to 0 4
Studdingsail Booms — —	400 to 100	0 3 to 0 2
Studdingsail Yards — —	400 to 100	0 2 to 0 1
Driver Boom — — —	400 to 100	0 5 to 0 4
Ensign-Staff — — —	400 to 100	0 3 to 0 2
Wedging the Mast in the Partners — — —	400 to 100	8 0 to 5 0

DIAMETERS OF MASTS

AT THEIR RESPECTIVE

QUARTERS, HEADS, HEELS, &c.

As they bear in Proportion to the given Diameter at the Partners, in the Table of Dimensions.

Diameter at the Partners.	Quarters. 60/61 1st	Quarters. 14/15 2d	Quarters. 6/7 3d	Heads. Lower part 6/7 Tha. Ship	Heads. Lower part 3/4 Fore &Aft	Heads. 5/8 Upper Part.	Heels. 6/7
Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
40	39 3/8	37 3/8	34 3/8	34 3/8	30	25	34 3/8
39 1/2	38 7/8	36 7/8	34	34	29 5/8	24 3/4	34
39	38 3/8	36 3/8	33 1/2	33 1/2	29 1/4	24 3/8	33 1/2
38 1/2	37 5/8	35 7/8	33	33	28 7/8	24	33
38	37 3/8	35 3/8	32 1/2	32 1/2	28 1/2	23 3/4	32 1/2
37 1/2	36 7/8	35	32 1/8	32 1/8	28 1/8	23 3/8	32 1/8
37	36 3/8	34 1/2	31 3/4	31 3/4	27 3/4	23 1/8	31 3/4
36 1/2	35 7/8	34	31 3/8	31 3/8	27 3/8	22 7/8	31 3/8
36	35 3/8	33 5/8	30 7/8	30 7/8	27	22 1/2	30 7/8
35 1/2	34 7/8	33 1/8	30 1/2	30 1/2	26 5/8	22 1/4	30 1/2
35	34 3/8	32 5/8	30	30	26 1/4	21 7/8	30
34 1/2	33 7/8	32 1/8	29 1/2	29 1/2	25 7/8	21 1/2	29 1/2
34	33 3/8	31 5/8	29 1/8	29 1/8	25 1/2	21 1/4	29 1/8
33 1/2	32 7/8	31 1/8	28 3/4	28 3/4	25 1/8	21	28 3/4
33	32 1/2	30 3/4	28 1/4	28 1/4	24 3/4	20 5/8	28 1/4
32 1/2	31 7/8	30 1/4	27 7/8	27 7/8	24 3/8	20 1/4	27 7/8
32	31 1/2	29 3/4	27 1/2	27 1/2	24	20	27 1/2
31 1/2	31	29 3/8	27	27	23 5/8	19 3/4	27
31	30 1/2	28 7/8	26 5/8	26 5/8	23 1/4	19 1/2	26 5/8
30 1/2	30	28 1/2	26	26	22 7/8	19 1/8	26
30	29 1/2	28	25 3/4	25 3/4	22 1/2	18 7/8	25 3/4
29 1/2	29	27 1/2	25 1/4	25 1/4	22 1/8	18 1/2	25 1/4

Diameter at the Partners.	Quarters. 60/61 1st	Quarters. 14/15 2d	Quarters. 6/7 3d	Heads. Lower part 6/7 Tha. Ship	Heads. Lower part 3/4 Fore &Aft	Heads. 5/8 Upper Part.	Heels. 6/7
Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
29	28 1/2	27	24 7/8	24 7/8	21 3/4	18 1/8	24 7/8
28 1/2	28	26 1/2	24 3/8	24 3/8	21 3/8	17 3/4	24 3/8
28	27 1/2	26 1/8	24	24	21	17 1/2	24
27 1/2	27	25 5/8	23 1/2	23 1/2	20 5/8	17 1/8	23 1/2
27	26 1/2	25 1/4	23 1/8	23 1/8	20 1/4	16 7/8	23 1/8
26 1/2	26	24 3/4	22 3/4	22 3/4	19 7/8	16 5/8	22 3/4
26	25 1/2	24 1/4	22 1/4	22 1/4	19 1/2	16 1/4	22 1/4
25 1/2	25	23 3/4	21 7/8	21 7/8	19 1/8	15 6/8	21 7/8
25	24 1/2	23 1/4	21 3/8	21 3/8	18 3/4	15 5/8	21 3/8
24 1/2	24	22 3/4	21	21	18 3/8	15 1/4	21
24	23 1/2	22 3/8	20 1/2	20 1/2	18	15	20 1/2
23 1/2	23 1/8	21 7/8	20 1/8	20 1/8	17 5/8	14 3/4	20 1/8
23	22 5/8	21 1/2	19 3/4	19 3/4	17 1/4	14 1/2	19 3/4
22 1/2	22 1/8	21	19 1/4	19 1/4	16 7/8	14 1/8	19 1/4
22	21 5/8	20 1/2	18 7/8	18 7/8	16 1/2	13 3/4	18 7/8
21 1/2	21 1/8	20	18 3/8	18 3/8	16 1/8	13 1/2	18 3/8
21	20 5/8	19 5/8	18	18	15 3/4	13 1/8	18
20 1/2	20 1/8	19 1/8	17 5/8	17 5/8	15 3/8	12 3/4	17 5/8
20	19 3/4	18 3/4	17 1/8	17 1/8	15	12 1/2	17 1/8
19 1/2	19 1/8	18 1/8	16 3/4	16 3/4	14 5/8	12 1/8	16 3/4
19	18 3/4	17 3/4	16 1/4	16 1/4	14 1/4	14 7/8	16 1/4

Diameter at the Partners.	Quarters. 60/61 1st	Quarters. 14/15 2d	Quarters. 6/7 3d	Heads. Lower part 6/7 Tha. Ship.	Heads. Lower part 3/4 Fore &Aft	Heads. 5/8 Upper Part.	Heels. 6/7
Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
18 1/2	18 1/8	17 1/4	15 3/4	15 3/4	13 7/8	11 1/2	15 3/4
Miz	en M	asts o	r Ma	sts th	at He	ad th	ems.
18	17 3/4	16 3/4	15 1/2	13 1/2	13 1/2	12	15 1/2
17 1/2	17 1/8	16 1/4	15	13 1/8	13 1/8	11 3/4	15
17	16 3/4	15 7/8	14 1/2	12 3/4	12 3/4	11 3/8	14 1/2
16 1/2	16 1/8	15 3/8	14 1/8	12 3/8	12 3/8	11	14 1/8
16	15 3/4	14 7/8	13 3/4	12	12	10 3/4	13 3/4
15 1/2	15 1/4	14 3/4	13 7/8	11 5/8	11 5/8	10 3/8	13 1/4
15	14 3/4	14	12 7/8	11 1/4	11 1/4	10	12 7/8
14 1/2	14 1/4	13 1/2	12 1/2	10 7/8	10 7/8	9 3/4	12 1/2
14	13 3/4	13	12	10 1/2	10 1/2	9 3/8	12
13 1/2	13 1/4	12 1/2	11 1/2	10 1/8	10 1/8	9	11 1/2
13	12 3/4	12 1/8	11 1/8	9 3/4	9 3/4	8 3/4	11 1/8
12 1/2	12 1/4	11 5/8	10 5/8	9 3/8	9 3/8	8 3/8	10 5/8
12	11 3/4	11 1/8	10 1/4	9	9	8	10 1/4
11 1/2	11 1/4	10 5/8	9 7/8	8 5/8	8 5/8	7 5/8	9 7/8
11	10 3/4	10 1/4	9 1/2	8 1/4	8 1/4	7 1/8	9 1/2
10 1/2	10 1/4	9 3/4	9	7 7/8	7 7/8	7	9
10	9 1/2	9 1/4	8 5/8	7 1/2	7 1/2	6 5/8	8 5/8
9 1/2	9 1/4	8 7/8	8 1/8	7 1/8	7 1/8	6 3/8	8 1/8
9	8 7/8	8 3/8	7 3/4	6 3/4	6 3/4	6	7 3/4

DIAMETERS

OF

TOP-MASTS, GALLANT-MASTS, AND ROYAL-MASTS,

AT THEIR RESPECTIVE

QUARTERS, HEADS, &c.

As they bear in Proportion to the given Diameter at the Cap, in the Table of Dimensions.

Diameter in the Cap.	Quarters. 60/61 1st	Quarters. 14/15 2d	Quarters. 6/7 3d	Head. 9/13 Lower Part.	Head. 6/11 Upper Part.
Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
22	21 5/8	20 1/2	18 7/8	15 1/4	12
21 1/2	21 1/8	20	18 3/8	14 7/8	11 3/4
21	20 5/8	19 5/8	18	14 1/2	11 1/2
20 1/2	20 1/8	19 1/8	17 5/8	14 1/8	11 1/8
20	19 3/4	18 3/4	17 1/8	13 7/8	10 7/8
19 1/2	19 1/8	18 1/8	16 3/4	13 1/2	10 5/8
19	18 3/4	17 3/4	16 1/4	13 1/8	10 3/8
18 1/2	18 1/8	17 1/4	15 3/4	12 7/8	10 1/8
18	17 3/4	16 3/4	15 1/2	12 1/2	9 7/8
17 1/2	17 1/8	16 1/4	15	12 1/8	9 1/2

Diameter in the Cap.	Quarters. 60/61 1st	Quarters. 14/15 2d	Quarters. 6/7 3d	Head. 9/13 Lower Part.	Head. 6/11 Upper Part.
Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
17	16 3/4	15 7/8	14 1/2	11 3/4	9 1/4
16 1/2	16 1/8	15 3/8	14 1/8	11 3/8	9
16	15 3/4	14 7/8	13 3/4	11 1/16	8 3/4
15 1/2	15 1/4	14 1/2	13 1/4	10 3/4	8 1/2
15	14 3/4	14	12 7/8	10 3/8	8 1/4
14 1/2	14 1/4	13 1/2	12 1/2	10	7 7/8
14	13 3/4	13	12	9 3/4	7 5/8
13 1/2	13 1/4	12 1/2	11 1/2	9 3/8	7 3/8
13	12 3/4	12 1/8	11 1/8	9	7 1/8
12 1/2	12 1/4	11 5/8	10 5/8	8 5/8	6 7/8

Diameter in the Cap.	Quarters. 60/61 1st	Quarters. 14/15 2d	Quarters. 6/7 3d	Head. 9/13 Lower Part.	Head. 6/11 Upper Part.
Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
12	11 3/4	11 1/8	10 1/4	8 5/16	6 5/8
11 1/2	11 1/4	10 5/8	9 7/8	7 15/16	6 1/4
11	10 3/4	10 1/4	9 1/2	7 5/8	6
10 1/2	10 1/4	9 3/4	9	7 1/4	5 3/4
10	9 3/4	9 1/4	8 5/8	6 15/16	5 1/2
9 1/2	9 1/4	9 3/8	8 1/8	6 9/16	5 1/4
9	8 7/8	8 7/8	7 3/4	6 1/4	5
8 1/2	8 3/8	7 7/8	7 1/4	5 15/16	4 5/8
8	7 7/8	7 7/16	6 7/8	5 1/2	4 3/8
7 1/2	7 3/8	7	6 3/8	5 1/8	4 1/8

Diameter in the Cap.	Quarters. 60/61 1st	Quarters. 14/15 2d	Quarters. 6/7 3d	Head. 9/13 Lower Part.	Head. 6/11 Upper Part.
Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
7	6 7/8	6 1/2	6	4 7/8	3 7/8
6 1/2	6 3/8	6 1/16	5 5/8	4 1/2	3 1/2
6	5 7/8	5 5/8	5 1/8	4 1/8	3 1/4
5 1/2	5 3/8	5 1/8	4 3/4	3 13/16	3
5	4 7/8	4 5/8	4 1/4	3 7/16	2 3/4
4 1/2	4 3/8	4 1/8	3 7/8	3 1/8	2 1/2
4	3 7/8	3 3/4	3 3/8	2 3/4	2 1/4
3 1/2	3 3/8	3 1/4	3	2 3/8	1 7/8
3	2 15/16	2 3/4	2 5/8	2 1/8	1 5/8

DIAMETERS OF BOWSPRITS

AT THEIR DIFFERENT

QUARTERS, &c.

As they bear in Proportion to the given Diameter at the Bed, in the Table of Dimenſions.

Diameter at the Bed.	Quarters. 60/61 1ſt	11/12 2d	4/5 3d	Outer End. 5/9	Heels. 6/7	Diameter at the Bed.	Quarters. 60/61 1ſt	11/12 2d	4/5 3d	Outer End. 5/9	Heels. 6/7	Diameter at the Bed.	Quarters. 60/61 1ſt.	11/12 2d	4/5 3d	Outer End 5/9	Heels. 6/7	Diameter at the Bed.	Quarters. 60/61 1ſt	11/12 2d	4/5 3d	Outer End. 5/9	Heels. 6/7
Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
38	37 3/8	34 7/8	30 3/8	21	32 1/2	31 1/2	31	28 7/8	25 1/4	17 1/2	27	25	24 1/2	22 7/8	20	13 7/8	21 3/8	18 1/2	18 1/8	17	14 3/4	10 1/4	15 3/4
37 1/2	36 7/8	34 3/8	30	20 3/4	32 1/8	31	30 1/2	28 1/2	24 3/4	17 1/4	26 5/8	24 1/2	24	22 1/2	19 5/8	13 5/8	21	18	17 3/4	16 1/2	14 3/8	10	15 1/2
37	36 3/8	34	29 1/2	20 1/2	31 3/4	30 1/2	30	28	24 3/8	17	26	24	23 1/2	22	19 1/4	13 1/4	20 1/2	17 1/2	17 1/8	16	14	9 3/4	15
36 1/2	35 7/8	33 1/2	29 1/8	20 1/4	31 1/4	30	29 1/2	27 1/2	24	16 3/4	25 3/4	23 1/2	23 1/8	21 1/2	18 3/4	13	20 1/8	17	16 3/4	15 1/2	13 5/8	9 1/2	14 1/2
36	35 3/8	33	28 3/4	20	30 7/8	29 1/2	29	27	23 5/8	16 1/2	25 1/4	23	22 5/8	21 1/8	18 3/8	12 3/4	19 3/4	16 1/2	16 1/8	15 1/8	13 1/8	9 1/4	14 1/8
35 1/2	34 7/8	32 5/8	28 3/8	19 3/4	30 1/2	29	28 1/2	26 5/8	23 1/4	16 1/8	24 7/8	22 1/2	22 1/8	20 5/8	18	12 1/2	19 1/4	16	15 3/4	14 5/8	12 3/4	9	13 3/4
35	34 3/8	32 1/8	28	19 1/2	30	28 1/2	28	26	22 3/4	15 7/8	24 3/8	22	21 5/8	20 1/8	17 1/2	12 1/4	18 7/8	15 1/2	15 1/4	14 1/8	12 3/8	8 5/8	13 1/4
34 1/2	33 7/8	31 5/8	27 5/8	19 1/4	29 1/2	28	27 1/2	25 5/8	22 3/8	15 1/2	24	21 1/2	21 1/8	19 3/4	17 1/8	12	18 3/8	15	14 3/4	13 7/8	12	8 3/8	12 7/8
34	33 3/8	31 1/8	27 1/4	18 7/8	29 1/8	27 1/2	27	25 1/4	22	15 1/4	23 1/2	21	20 5/8	19 1/4	16 3/4	11 3/4	18	14 1/2	14 1/4	13 1/4	11 5/8	8	12 1/2
33 1/2	32 7/8	30 5/8	26 3/4	18 5/8	28 3/4	27	26 1/2	24 3/4	21 5/8	15	23 1/8	20 1/2	20 1/8	18 4/10	16 3/8	11 1/2	17 5/8	14	13 3/4	12 7/8	11 1/8	7 3/4	12
33	32 1/2	30 1/4	26 3/8	18 1/8	28 1/4	26 1/2	26	24 1/4	21 1/4	14 3/4	22 3/4	20	19 3/4	18 1/4	16	11 1/8	17 1/8	13 1/2	13 1/4	12 3/8	10 3/4	7 1/2	11 1/2
32 1/2	31 7/8	29 3/4	26	18	27 7/8	26	25 1/2	23 7/8	20 3/4	14 1/2	22 1/4	19 1/2	19 1/8	17 7/8	15 5/8	10 7/8	16 3/4	13	12 3/4	11 7/8	10 3/8	7 1/4	11 1/8
32	31 1/2	29 3/8	25 5/8	17 3/4	27 1/2	25 1/2	25	23 3/8	20 3/8	14 1/8	21 7/8	19	18 3/4	17 1/2	15 1/8	10 1/2	16 1/4	12 1/2	12 1/4	11 1/2	10	7	10 5/8

Diameters of Mizen-Yards at their different Quarters, as they bear in Proportion to the given Diameter at the Slings in the Table of Dimenſions.

Diameter at the Slings.	Upper Arm. Quarters. 30/31 1ſt	7/8 2d	7/10 3d	2/5 Arm	Lower Arm. Quarters. 60/61 1ſt	11/12 2d	5/6 3d	2/3 Arm
Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc	Inc.
17	16 1/2	14 7/8	11 7/8	6 3/4	16 3/4	15 1/2	14 1/8	11 3/8
16 1/2	16	14 3/8	11 1/2	6 5/8	16 1/8	15 1/8	13 3/4	11
16	15 1/2	14	11 3/8	6 3/8	15 3/4	14 5/8	13 3/8	10 3/4
15 1/2	15	13 1/2	10 7/8	6 1/8	15 1/4	14 1/8	13	10 3/8
15	14 1/2	13 1/8	10 1/2	6	14 3/4	13 7/8	12 1/2	10
14 1/2	14	12 5/8	10 1/8	5 3/4	14 1/4	13 1/4	12	9 3/4
14	13 1/2	12 1/4	9 3/4	5 5/8	13 3/4	12 7/8	11 3/4	9 3/8
13 1/2	13	11 3/4	9 1/2	5 3/8	13 1/4	12 3/8	11 1/4	9
13	12 5/8	11 3/8	9 1/16	5 1/4	12 3/4	11 7/8	10 7/8	8 3/4
12 1/2	12 1/8	10 7/8	8 3/4	5	12 1/4	11 1/2	10 3/8	8 3/8
12	11 5/8	10 1/2	8 7/16	4 7/8	11 3/4	11	10	8
11 1/2	11 1/8	10	8	4 5/8	11 1/4	10 1/2	9 5/8	7 5/8
11	10 5/8	9 5/8	7 3/4	4 3/8	10 3/4	10 1/16	9 1/8	7 3/8
10 1/2	10 1/8	9 1/8	7 3/8	4 1/4	10 1/4	9 5/8	8 3/4	7
10	9 3/4	8 3/4	7	4	9 3/4	9 1/8	8 3/8	6 5/8
9 1/2	9 1/4	8 1/4	6 5/8	3 3/4	9 1/4	8 3/4	7 7/8	6 3/8
9	8 3/4	7 7/8	6 1/4	3 5/8	8 7/8	8 1/4	7 1/2	6
8 1/2	8 1/4	7 3/8	5 15/16	3 3/8	8 3/8	7 3/4	7 1/16	5 5/8
8	7 3/4	7	5 5/8	3 3/16	7 7/8	7 3/8	6 5/8	5 3/8
7 1/2	7 1/4	6 1/2	5 1/4	3	7 3/8	6 7/8	6 1/4	5
7	6 3/4	6 1/8	4 15/16	2 13/16	6 7/8	6 3/8	5 7/8	4 5/8
6 1/2	6 1/4	5 3/4	4 9/16	2 5/8	6 3/8	6	5 3/8	4 3/8
6	5 3/4	5 1/4	4 1/4	2 7/16	5 7/8	5 1/2	5	4
5 1/2	5 3/8	4 7/8	3 7/8	2 1/4	5 3/8	5	4 5/8	3 5/8
5	4 7/8	4 3/8	3 1/2	2	4 7/8	4 1/2	4 1/8	3 3/8

Diameter of Yards in general, at their different Quarters, as they bear in Proportion to the given Diameter at the Slings, in the Table of Dimenſions.

Diameter at the Slings.	Quarters. 30/31 1ſt	7/8 2d	7/10 3d	3/7 Arm	Diameter at the Slings.	Quarters. 30/31 1ſt	7/8 2d	3/10 3d	3/7 Arm
Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
25	24 1/8	21 7/8	17 1/2	10 3/4	13	12 1/2	11 1/4	9 1/16	5 9/16
24 1/2	23 5/8	21 3/8	17 1/8	10 1/2	12 1/2	12 1/16	10 7/8	8 3/4	5 3/8
24	23 1/4	221	16 3/4	10 1/4	12	11 5/8	10 1/2	8 3/8	5 1/8
23 1/2	22 3/4	21 3/8	16 1/2	10 1/16	11 1/2	11 1/16	10	8	4 15/16
23	22 1/4	10	16 1/16	9 7/8	11	10 5/8	9 5/8	7 3/4	4 3/4
22 1/2	21 3/4	19 3/4	15 3/4	9 5/8	10 1/2	10 1/16	9 1/8	7 3/8	4 1/2
22	21 1/4	19 1/4	15 3/8	9 9/16	10	9 5/8	8 3/4	7	4 1/4
21 1/2	20 3/4	18 7/8	15	9 1/4	9 1/2	9 1/8	8 1/4	6 5/8	4 1/16
21	20 1/4	18 3/8	14 3/4	9	9	8 3/4	7 7/8	6 1/4	3 7/8
20 1/2	19 7/8	17 15/16	14 3/8	8 3/4	8 1/2	8 1/4	7 3/8	5 15/16	3 5/8
20	19 3/8	17 1/2	14	8 9/16	8	7 3/4	7	5 5/8	3 3/8
19 1/2	18 7/8	17	13 5/8	8 3/8	7 1/2	7 1/4	6 2/16	5 1/4	3 1/4
19	18 1/2	16 1/2	13 1/4	8 1/8	7	6 3/4	6 1/8	4 15/16	3
18 1/2	17 15/16	16 1/8	1 3	8	6 1/2	6 1/4	5 3/4	4 1/2	2 3/4
18	17 1/2	15 3/4	12 5/8	7 3/4	6	5 7/8	5 1/4	4 3/16	2 9/16
17 1/2	17	15 1/4	12 1/4	7 1/2	5 1/2	5 5/16	4 7/8	3 7/8	2 3/8
17	16 1/2	14 7/8	11 7/8	7 1/4	5	4 7/8	4 3/8	3 1/2	2 1/8
16 1/2	16	14 3/8	11 5/8	7 1/16	4 1/2	4 3/8	3 15/16	3 1/8	1 15/16
16	15 1/2	14	11 3/16	6 7/8	4	3 7/8	3 1/2	2 13/16	1 3/4
15 1/2	15	13 9/16	10 7/8	6 5/8	3 1/2	3 3/8	3 1/16	2 7/16	1 1/4
15	14 1/2	13 1/8	10 1/2	6 1/2	3	2 15/16	2 5/8	2 1/8	1 1/2
14 1/2	14	12 3/4	10 1/8	6 1/4	2 1/2	2 7/16	2 3/16	1 3/4	1 1/8
14	13 1/2	12 1/4	9 3/4	6	2	2 15/16	1 3/4	1 3/8	1
13 1/2	13	11 7/8	9 1/2	5 3/4					

DIAMETERS OF BOOMS

AT THEIR DIFFERENT

QUARTERS,

As they bear in Proportion to the given Diameter in the Middle, in the Table of Dimensions.

DRIVER BOOMS AND BOOMS IN GENERAL.					MAIN BOOMS.						
Diameter in the Middle of the Driver - Boom, others $\frac{1}{3}$ from the End.	QUARTERS. $\frac{40}{41}$ 1ſt	$\frac{11}{12}$ 2d	$\frac{5}{6}$ 3d	ENDS. $\frac{2}{3}$	Diameter at the Sheet.	QUARTERS. $\frac{40}{41}$ 1ſt	$\frac{12}{13}$ 2d	$\frac{7}{8}$ 3d	Fore End. $\frac{2}{3}$	Middle. $\frac{11}{12}$	AfterEnd. $\frac{3}{4}$
Inches.	nc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
16	$15\frac{5}{8}$	$14\frac{5}{8}$	$13\frac{3}{8}$	$10\frac{3}{8}$	16	$15\frac{5}{8}$	$14\frac{3}{4}$	14	$10\frac{5}{8}$	$14\frac{5}{8}$	12
$15\frac{1}{2}$	$15\frac{1}{16}$	$14\frac{1}{8}$	13	$10\frac{1}{4}$	$15\frac{1}{2}$	$15\frac{1}{16}$	$14\frac{1}{4}$	$13\frac{1}{2}$	$10\frac{1}{4}$	$14\frac{1}{8}$	$11\frac{5}{8}$
15	$14\frac{5}{8}$	$13\frac{3}{4}$	$12\frac{1}{2}$	10	15	$14\frac{5}{8}$	$13\frac{7}{8}$	$13\frac{1}{8}$	10	$13\frac{3}{4}$	$11\frac{1}{4}$
$14\frac{1}{2}$	$14\frac{1}{16}$	$13\frac{1}{4}$	12	$9\frac{3}{4}$	$14\frac{1}{2}$	$14\frac{1}{16}$	$13\frac{3}{8}$	$12\frac{5}{8}$	$9\frac{3}{4}$	$13\frac{1}{4}$	$10\frac{7}{8}$
14	$13\frac{3}{4}$	$12\frac{7}{8}$	$11\frac{5}{8}$	$9\frac{3}{8}$	14	$13\frac{3}{4}$	13	$12\frac{1}{4}$	$9\frac{3}{8}$	$12\frac{7}{8}$	$10\frac{1}{2}$
$13\frac{1}{2}$	$13\frac{1}{8}$	$12\frac{3}{8}$	$11\frac{1}{4}$	9	$13\frac{1}{2}$	$13\frac{1}{8}$	$12\frac{1}{2}$	$11\frac{3}{4}$	9	$12\frac{3}{8}$	$10\frac{1}{8}$
13	$12\frac{3}{4}$	$11\frac{15}{16}$	$10\frac{7}{8}$	$8\frac{3}{4}$	13	$12\frac{3}{4}$	12	$11\frac{3}{8}$	$8\frac{3}{4}$	$11\frac{15}{16}$	$9\frac{3}{4}$
$12\frac{1}{2}$	$12\frac{1}{8}$	$11\frac{1}{2}$	$10\frac{7}{16}$	$8\frac{1}{4}$	$12\frac{1}{2}$	$12\frac{1}{8}$	$11\frac{9}{16}$	$10\frac{7}{8}$	$8\frac{1}{4}$	$11\frac{1}{2}$	$9\frac{3}{8}$
12	$11\frac{3}{4}$	11	10	8	12	$11\frac{3}{4}$	$11\frac{1}{16}$	$10\frac{1}{2}$	8	11	9
$11\frac{1}{2}$	$11\frac{1}{8}$	$10\frac{1}{2}$	$9\frac{5}{8}$	$7\frac{5}{8}$	$11\frac{1}{2}$	$11\frac{1}{8}$	$10\frac{9}{16}$	10	$7\frac{5}{8}$	$10\frac{1}{2}$	$8\frac{5}{8}$
11	$10\frac{3}{4}$	$10\frac{1}{16}$	$9\frac{1}{8}$	$7\frac{3}{8}$	11	$10\frac{3}{4}$	$10\frac{1}{8}$	$9\frac{5}{8}$	$7\frac{3}{8}$	$10\frac{1}{16}$	$8\frac{1}{4}$
$10\frac{1}{2}$	$10\frac{1}{4}$	$9\frac{5}{8}$	$8\frac{3}{4}$	7	$10\frac{1}{2}$	$10\frac{1}{4}$	$9\frac{11}{16}$	$9\frac{1}{8}$	7	$9\frac{5}{8}$	$7\frac{7}{8}$
10	$9\frac{3}{8}$	$9\frac{1}{8}$	$8\frac{3}{8}$	$6\frac{5}{8}$	10	$9\frac{3}{8}$	$9\frac{1}{4}$	$8\frac{3}{4}$	$6\frac{5}{8}$	$9\frac{1}{8}$	$7\frac{1}{2}$
$9\frac{1}{2}$	$9\frac{1}{4}$	$8\frac{3}{4}$	$7\frac{15}{16}$	$6\frac{1}{4}$	$9\frac{1}{2}$	$9\frac{1}{4}$	$8\frac{3}{4}$	$8\frac{1}{4}$	$6\frac{1}{4}$	$8\frac{3}{4}$	$7\frac{1}{8}$
9	$8\frac{3}{4}$	$8\frac{1}{4}$	$7\frac{1}{2}$	6	9	$8\frac{3}{4}$	$8\frac{5}{16}$	$7\frac{7}{8}$	6	$8\frac{1}{4}$	$6\frac{3}{4}$
$8\frac{1}{2}$	$8\frac{1}{4}$	$7\frac{3}{4}$	$7\frac{1}{16}$	$5\frac{5}{8}$	$8\frac{1}{2}$	$8\frac{1}{4}$	$7\frac{13}{16}$	$7\frac{3}{8}$	$5\frac{5}{8}$	$7\frac{3}{4}$	$6\frac{3}{8}$
8	$7\frac{7}{8}$	$7\frac{3}{8}$	$6\frac{5}{8}$	$5\frac{3}{8}$	8	$7\frac{7}{8}$	$7\frac{7}{16}$	7	$5\frac{3}{8}$	$7\frac{3}{8}$	6
$7\frac{1}{2}$	$7\frac{3}{8}$	$6\frac{7}{8}$	$6\frac{1}{4}$	5							
7	$6\frac{7}{8}$	$6\frac{3}{8}$	$5\frac{7}{8}$	$4\frac{3}{4}$							
$6\frac{1}{2}$	$6\frac{3}{8}$	6	$5\frac{7}{16}$	$4\frac{3}{8}$							
6	$5\frac{7}{8}$	$5\frac{1}{2}$	5	4							
$5\frac{1}{2}$	$5\frac{3}{8}$	$5\frac{1}{16}$	$4\frac{5}{8}$	$3\frac{11}{16}$							
5	$1\frac{7}{8}$	$4\frac{5}{8}$	$4\frac{1}{8}$	$3\frac{3}{8}$							
$4\frac{1}{2}$	$4\frac{3}{8}$	$4\frac{1}{8}$	$3\frac{3}{4}$	3							
4	$3\frac{7}{8}$	$3\frac{5}{8}$	$3\frac{3}{8}$	$2\frac{5}{8}$							
$3\frac{1}{2}$	$3\frac{7}{16}$	$3\frac{1}{4}$	$2\frac{15}{16}$	$2\frac{3}{8}$							
3	$2\frac{15}{16}$	$2\frac{3}{4}$	$2\frac{1}{2}$	2							

DIAMETERS

OF

GAFFS,

AT THEIR

DIFFERENT QUARTERS,

AS THEY BEAR IN PROPORTION TO THE

GIVEN DIAMETER

IN THE

TABLE OF DIMENSIONS.

GAFFS.				
Diameter four Feet from the End.	QUARTERS. $\frac{40}{41}$ 1ſt	$\frac{11}{12}$ 2d	$\frac{4}{5}$ 3d	END. $\frac{5}{9}$
Inches.	Inches.	nchs.	Inches.	Inches.
12	$11\frac{3}{4}$	11	$9\frac{5}{8}$	$6\frac{5}{8}$
$11\frac{1}{2}$	$11\frac{1}{8}$	$10\frac{1}{2}$	$9\frac{1}{8}$	$6\frac{3}{8}$
11	$10\frac{3}{4}$	$10\frac{1}{16}$	$8\frac{3}{4}$	$6\frac{1}{8}$
$10\frac{1}{2}$	$10\frac{1}{4}$	$9\frac{5}{8}$	$8\frac{3}{8}$	$5\frac{7}{8}$
10	$9\frac{3}{8}$	$9\frac{1}{8}$	8	$5\frac{9}{16}$
$9\frac{1}{2}$	$9\frac{1}{4}$	$8\frac{3}{4}$	$7\frac{9}{16}$	$5\frac{1}{4}$
9	$8\frac{3}{4}$	$8\frac{1}{4}$	$7\frac{1}{4}$	5
$8\frac{1}{2}$	$8\frac{1}{4}$	$7\frac{3}{4}$	$6\frac{3}{4}$	$4\frac{3}{4}$
8	$7\frac{7}{8}$	$7\frac{3}{8}$	$6\frac{3}{8}$	$4\frac{7}{16}$
$7\frac{1}{2}$	$7\frac{3}{8}$	$6\frac{7}{8}$	6	$4\frac{1}{8}$
7	$6\frac{7}{8}$	$6\frac{3}{8}$	$5\frac{9}{16}$	$3\frac{7}{8}$
$6\frac{1}{2}$	$6\frac{3}{8}$	6	$5\frac{3}{16}$	$3\frac{5}{8}$
6	$5\frac{7}{8}$	$5\frac{1}{2}$	$4\frac{3}{4}$	$3\frac{5}{16}$

METHOD OF MEASURING ROUGH TREES FOR MASTS.

The length to be 3 times, in feet, what the diameter is in inches at the partners, adding 9 feet.

The meaſuring-place for the partners is $\frac{2}{3}$, in feet, from the butt what the maſt meaſures in inches at the partners. The hounds to be ſet back from the length at half the diſtance from the butt to the partners; and from the hounds to the partners to be divided into 4 equal parts, called quarters. The quarters, hounds, and heel, to bear the following proportions to the diameter at the partners: *viz.* Firſt quarter, $\frac{60}{61}$; ſecond quarter, $\frac{13}{14}$; third quarter, $\frac{6}{7}$; hounds, $\frac{2}{3}$; and heel, $\frac{5}{6}$.

HAND-MASTS to be of the ſizes at the partners as in the Table of the Value of Fir Timber; which is, 8 inches from the butt for every hand in circumference, (that is, ſuppoſing the circumference to be 6 hands, the diſtance of the partners from the butt is 6 times 8, or 48 inches,) and $\frac{11}{12}$ that bigneſs in the middle between the partners and the top, there to girth $\frac{2}{3}$ the bigneſs of the partners. The length is governed in proportion to the number of hands in circumference at the partners, as follows: Add 6 inches to the number of hands, and multiply by 3, the product is the length in feet and inches. Or, multiply the number of hands by 3 and add 18 feet. — Four inches make a hand.

BOWSPRITS to be in length $\frac{2}{3}$, in yards, what the diameter is in inches at the bed or meaſuring-place, that being $\frac{2}{3}$ in feet from the butt what the bowſprit is intended to meaſure in inches at that place.

MASTS from AMERICA are moſtly trimmed in the country nearly to their ſizes, ſo that the diameter and length as per Table is ſufficient.

YARDS to be in length as per Table, and to hold that diameter in the middle, and half that diameter at the ends.

DUTIES ON MASTS PAYABLE IN GREAT-BRITAIN.

MASTS, 6 inches in diameter and under 8, imported in a Britiſh-built ſhip, 1s. 1d.$\frac{1}{2}$. Drawback 1s. Ditto in a foreign-built ſhip, the maſt, 1s. 2d. Drawback 1s. Maſts, 8 inches in Diameter and under 12 inches, in a Britiſh ſhip, the maſt, 3s. 4d. Drawback 3s. 1d. Ditto in a foreign ſhip, the maſt, 3s. 6d. Drawback 3s. 1d. 12 inches or upwards, in Britiſh ſhips, the maſt, 6s. 8d. Drawback 6s. 2d. Ditto in foreign ſhips 6s. 11d. Drawback 6s. 2d.—SCAVAGE-RATES. (Port of London.) Large maſt 2d. Middle maſt 1d. Small maſt 0d.$\frac{1}{2}$.

A TABLE OF ROUGH TREES
MOST SUITABLE FOR THE VARIOUS PARTS OF MASTS, BOWSPRITS, AND YARDS.

Rough Trees for Masts, Yards, and Bowsprits, made of single Trees, need not be above Two Inches larger than the Dimensions in the Table of Masts, &c. — Foremasts, Yards, &c. are made of single Trees.

NAMES OF THE MASTS & YARDS.	100 GUNS.			90 GUNS.			80 GUNS.			74 GUNS.			64 GUNS.			50 GUNS.			44 GUNS.		
	Length	Dia.	Numb.	Length	Dia.	Numb.	Length	Dia.	Numb.	Length	Dia.	Numb.	Length	Dia.	Numb.	Length	Dia.	Numb.	Length	Dia.	Numb.
Main Mast	Ft. Inc.	Inch		Ft Inc.	Inch.		Ft Inc.	Inch		Ft Inc.	Inch		Ft Inc.	Inch		Ft Inc.	Inch		Ft Inc.	Inch	
Spindle — —	84 0	22½	2	83 0	22	2	80 0	21½	2	83 0	22	2	78 0	22	2	77 0	18½	2	63 0	18½	1
Side Trees —	77 0	21½	4	76 0	20½	4	76 0	20	4	76 6	20½	4	75 0	20	4	70 0	19	2	64 0	18	2
Fishes —	80 0	22½	1	92 0	22	1	90 0	21½	1	92 0	22	1	81 0	21	1	74 0	19	1	72 0	18½	1
MainMasts made of	Two New England Trees.						Ditto.			Ditto.			Ditto.			Ditto.			Two Riga T.		
Lower Tree —	98 0	30½	1	92 0	28½	1	90 0	27½	1	92 0	28½	1	87 0	26	1	78 6	23½	1	78 0	21½	1
Upper Tree —	98 0	30	1	94 0	28	1	90 0	27	1	94 0	28	1	87 0	25½	1	78 6	23	1	78 0	21	1
Side Fishes —	94 0	26	1	86 0	24	1	84 0	23	1	86 6	24	1	80 0	22½	1	66 6	19½	1	78 0	18	1
Fore-Masts made of	Three Riga Trees.						Ditto.			Ditto.			Ditto.			Ditto.			Ditto.		
Spindle — —	74 0	22	2	74 0	21½		70 0	20	2	74 0	21½	2	69 0	19½	2	67 0	20	1	78 0	19½	1
																Low. & Upp. T.					
Side Trees —	76 0	22½	2	76 0	22½	2	76 0	22	2	72 0	22½	2	67 0	20	2	64 0	19	2	78 0	19½	1
Fishes —	76 0	22½	1	80 0	22½	1	74 0	22	1	82 0	22½	1	72 0	21	1	71 0	18	1	70 0	17½	1
Mizen Masts made	of Two Riga Trees.						Ditto.			Ditto.			Ditto.			One Riga Tr.			Ditto.		
Lower Tree —	86 0	21	1	84 0	20½	1	80 0	19½	1	82 0	20½	1	76 0	18	1	} 79 0	21	1	75 0	20	1
Upper Tree —	86 0	20	1	84 0	20	1	80 0	18½	1	82 0	20	1	76 0	17½	1						
Fishes — —	84 0	19	1	80 0	18	1	76 0	18	1	80 0	18	1	74 0	17½	1						
Bowsprits made of	Two Riga Trees.						Ditto.			Ditto.			Ditto.			One New England Tr.					
Main Trees —	74 0	22½	2	72 0	22	2	70 0	22	2	69 0	22	2	62 0	20	2	} 56 0	29	1	53 0	27	1
Fishes — —	74 0	23	1	72 0	22½	1	70 0	22½	1	69 0	22½	1	62 0	20½	1						
Main Yards made	of Two Riga Trees.						Ditto.			Ditto.			Ditto.			One Riga Tr.			Ditto.		
Two Trees —	80 0	26	2	76 0	23	2	70 0	23	2	74 0	23½	2	60 0	22	2	82 0	[illegible]	1	80 0	20	1
Fore Yards made of	Two Trees.			Ditto.			Ditto.			Ditto.			One Tree.			Ditto.			Ditto.		
Two Trees —	70 0	23	2	65 0	22	2	55 0	21	2	60 0	21	2	79 6	21	1	72 0	19½	1	70 0	19	1

NAMES OF THE MASTS & YARDS.	38 GUNS.			36 GUNS.			32 GUNS.			28 GUNS.			24 GUNS.			20 GUNS.			SLOOPS.		
	Length	Dia.	Numb.	Length	Dia.	Numb.	Length	Dia.	Numb.	Length	Dia.	Numb.	Length	Dia.	Numb.	Length	Dia.	Numb.	Length	Dia.	Numb.
Main Mast	Ft Inc.	Inch.		Ft Inc.	Inch		Ft Inc.	Inch		Ft Inc.	Inch		Ft Inc.	Inch		Ft Inc.	Inch		Ft Inc.	Inch	
Spindle — —	67 0	19	1	67 0	19	1	63 0	18	1	60 0	17	1	—	—	—	—	—	—	—	—	—
Side Trees —	64 6	18½	2	64 0	18½	2	60 0	17½	2	60 0	17	2	—	—	—	—	—	—	—	—	—
Fishes —	72 0	18½	1	70 0	18½	1	66 0	18	1	62 0	17	1	—	—	—	—	—	—	—	—	—
MainMasts made of	Two Riga Trees.						Ditto.			Ditto.			Ditto.			Ditto.			Ditto.		
Lower Tree —	80 0	22	1	78 0	21½	1	75 6	20	1	77 0	19½	1	67 0	18	1	} Single Tree					
Upper Tree —	80 0	21½	1	78 0	21	1	75 6	19½	1	77 0	19½	1	67 0	18	1	} 72 0	23	1	63 0	20½	1
																Front	Fish				
Side Fishes —	80 0	19	1	78 0	18	1	68 0	18	1	64 0	17½	1	60 0	17	1	66 0	17	½	55 0	16	½
Fore-Masts made of	Two Riga Trees.						Ditto.			Ditto.			Ditto.			Ditto.			Ditto.		
Spindle — —	80 0	19½	1	80 0	19½	1	68 0	18	1	66 6	16½	1	} Single Tree								
Side Trees —	80 0	19½	1	80 0	19	1	68 0	17½	1	66 6	16	1	} 66 6	21	1	64 0	21½	1	56 0	18	1
													Front	Fish							
Fishes —	66 0	19	½	66 0	18½	½	66 0	17½	1	58 0	16½	1	60 0	17	½	58 0	15½	½	48 0	14	½
Mizen-Masts made	of One Riga Tree.						Ditto.			Ditto.			Ditto.			Ditto.			Ditto.		
Lower Tree —	} 76 0	20	1	75 0	19½	1	72 0	19	1	69 0	19	1	64 0	17	1	61 0	16	1	48 0	14	1
Upper Tree —																					
Fishes — —																					
Bowsprits made of	One New England Tree.						One Riga Tr.			Ditto			Ditto.			Ditto.			Ditto.		
Main Trees —	} 55 0	27	1	54 0	26	1	52 0	25		49 0	24	1	45 0	23	1	44 0	22	1	38 0	19	1
Fishes — —																					
Main Yards made	of One Riga Tree.						Ditto.			Ditto.			Ditto.			Ditto.			Ditto.		
Two Trees —	82 0	21	1	79 0	20	1	75 0	20	1	72 0	19	1	66 0	18	1	63 0	16	1	56 0	15	1
Fore Yards made of	One Tree.			Ditto.			Ditto.			Ditto.			Ditto.			Ditto.			Ditto.		
Two Trees —	72 0	19	1	70 0	18½	1	65 0	18	1	62 0	17	1	58 0	16	1	55 0	14	1	49 0	13½	1

Dimensions of Masts and Yards in the Royal Navy,

Taken at the Partners; which are at the Midde-Deck in Three-Decked Ships, and at the Upper-Deck in all other Ships.

NAMES OF THE MASTS AND YARDS.	100 GUNS. 2164 Tons.				90 GUNS, 1931 Tons.				80 GUNS. 1615 Tons.				74 GUNS. 1799 Tons.			
	Masts.		Yards.		Masts.		Yards.		Masts.		Yards.		Masts.		Yards.	
	Length Ft. In.	Dia. Inc.	Length Ft. In.	Dia. Inc.	Length Ft. In.	Dia. Inc.	Len. F. I.	Dia. Inc.	Length Ft. In.	Dia. Inc.	Len. F. I.	Dia. Inc.	Length Ft. In.	Dia. Inc.	Len. F. I.	Dia. Inc.
Main	117 0	39	102 4	24	112 0	37¼	98 0	22¼	107 0	35⅝	93 0	22	111 0	37	97 0	23
Main Top	70 0	20¾	73 0	15½	66 0	19¾	70 0	14¾	64 0	19¼	66 6	14⅛	66 0	19¾	70 0	15
Main Top Gallant	35 0	11⅝	48 9	10	33 0	11	46 6	9⅜	32 0	10¼	46 0	9¼	33 0	11¼	46 6	9½
Main Top Gallant Royal	0 0	0	36 0	7¾	0 0	0	35 0	7⅜	0 0	0	33 0	7	0 0	0	35 0	7½
Fore	103 6	34½	89 1	21	100 0	33½	85 9	20	95 9	31⅞	81 4	19⅜	98 6	32¾	85 0	20
Fore Top	62 10	20¾	64 6	13¾	59 0	19¾	61 0	12⅞	59 9	19¼	58 0	12¼	58 8	19¾	62 0	13
Fore Top Gallant	31 0	10¾	43 0	8⅝	29 0	9⅝	40 6	8¼	28 6	9½	40 0	8¼	29 4	9¾	40 6	8¼
Fore Top Gallant Royal	0 0	0	32 0	6⅞	0 0	0	30 0	6⅜	0 0	0	29 0	6⅛	0-0	0	31 0	6½
Mizen	101 4	23	87 0	16	96 6	22¼	84 0	15	93 0	21⅛	76 0	14½	95 0	22¼	84 0	15½
Mizen Top	52 0	.14	49 0	10⅛	49 0	13½	47 0	9¾	46 0	13¼	43 0	8⅞	49 0	13½	47 0	9¾
Mizen Top Gallant	26 0	8⅝	32 9	6½	24 0	8	31 0	6¼	23 0	7⅝	29 0	5¾	24 6	8⅛	31 6	6⅜
Mizen Top Gallant Royal	0 0	0	24 0	5	0 0	0	23 0	4⅞	0 0	0	21 0	4⅜	0 0	0	23 0	4⅞
			Sprit	fail			Sprit	fail			Sprit	fail.			Sprit	fail
Bowfprit	74 0	37	64 6	13¾	71 0	35½	61 0	12⅞	68 0	34	58 0	12¼	67 6	35	62 0	13
			Sprit T	opfa.			Sp.T	opf.			Sp.T	opf.			Sp.T	opf.
Jib Boom	53 0	45¼	43 0	8⅝	50 9	14½	40 6	8¼	48 0	14	40 0	8¼	50 4	14½	40 6	8¼
Driver Boom	0 0	0	0 0	0	0 0	0	0 0	0	0 0	0	0 0	0	0 0	0	0 0	0
Crofs Jack	0 0	0	64 6	13¾	0 0	0	61 0	12⅞	0 0	0	58 0	12¼	0 0	0	62 0	13
Lower Studding Boom	56 9	11¼	33 0	6¾	54 6	11	31 0	6¼	51 6	10¼	29 6	6	53 9	10¾	31 0	6¼
Main Top Boom	51 2	10⅛	29 6	6	49 0	10	28 0	3¾	46 6	9¼	26 6	5¼	48 6	9¾	27 3	5½
Main Top Gallant Boom	36 6	7¼	21 0	4¼	35 0	7	20 0	4	33 3	6¾	19 0	3¾	35 0	7	20 0	4
Fore Top Boom	44 6	9	25 6	5⅛	42 10	8½	24 6	5	40 8	8⅛	23 4	4¾	42 6	8½	24 6	5
Fore Top Gallant Boom	32 3	6½	18 6	3¾	30 6	6⅛	17 6	3½	29 0	5⅞	16 6	3¼	31 0	6¼	17 9	3½
Enfign Staff	45 0	7½	0 0	0	40 0	6½	0 0	0	39 0	6½	0 0	0	40 0	6½	0 0	0
Jack Staff	19 6	4¾	0 0	0	18 0	4½	0 0	0	17 6	4¼	0 0	0	18 0	4½	0 0	0
Fire Boom	38 0	11¼	0 0	0	36 0	11	0 0	0	34 0	10¼	0 0	0	35 6	10¾	0 0	0

NAMES OF THE MASTS AND YARDS.	64 GUNS. 1369 Tons.				50 GUNS. 1044 Tons.				44 GUNS. 879 Tons.				38 GUNS. 951 Tons.			
Main	101 0	33½	90 4	21	92 0	29	82 0	19¼	88 0	26¼	80 0	18½	90 0	27	81 9	19
Main Top	58 6	17⅝	65 4	13⅝	53 0	16	60 9	12½	53 0	15¾	57 6	11⅞	54 0	16⅛	59 0	12¼
Main Top Gallant	29 3	9¾	39 0	7⅞	26 6	8⅞	36 0	7⅜	26 6	8¾	36 0	7⅜	27 0	9	37 0	7½
Main Top Gallant Royal	0 0	0	32 0	6¾	0 0	0	30 0	6¼	0 0	0	28 9	5⅞	0 0	0	29 0	6⅛
Fore	89 7	29¾	79 6	18½	81 6	26⅜	72 0	17	78 0	23⅝	70 0	16¼	80 0	23⅝	71 6	16⅜
Fore Top	53 0	17⅝	57 6	12⅛	48 0	16	52 6	11	47 0	15¾	52 0	10¾	48 0	16⅛	53 0	11½
Fore Top Gallant	26 6	8¾	34 6	7	24 0	8	31 6	6¼	23 6	7¾	32 0	6⅜	24 0	8	32 9	6½
Fore Top Gallant Royal	0 0	0	28 6	6	0 0	0	26 0	5½	0 0	0	26 0	5⅜	0 0	0	26 0	5¾
							Ga	ff			Ga	ff			Ga	ff
Mizen	86 0	19¾	77 0	14	78 9	19⅜	44 0	11½	74 6	17⅞	36 8	11	75 7	18⅛	38 0	11½
Mizen Top	43 6	12¼	43 3	9	40 0	11⅛	39 6	8¼	40 0	11	39 6	8	41 0	11¼	40 0	8¼
Mizen Top Gallant	21 9	7¼	29 0	5¾	20 0	6⅝	26 0	5¼	20 0	6⅝	25 9	5⅛	20 6	6¾	27 9	5½
Mizen Top Gallant Royal	0 0	0	21 0	4½	0 0	0	19 0	4⅛	0 0	0	19 0	4	0 0	0	20 0	4⅛
			Sprit	fail			Sprit	fail			Sprit	fail			Sprit	fail
Bowfprit	60 4	31½	57 6	12⅛	56 0	29	52 6	11	52 6	26¼	52 0	10⅜	55 0	27	53 0	11½
			Sprit T	opf.			Sp T	opf.			Sp.T	opf.			Sp T	opf.
Jib Boom	43 9	13	34 6	7	39 8	11¾	31 6	6¼	39 0	11½	32 0	6⅜	38 7	11½	32 9	6½
Driver Boom	0 0	0	0 0	0	60 9	11½	31 6	6¼	57 6	10¾	32 0	6⅜	59 0	11½	32 9	6½
Crofs Jack	0 0	0	57 6	12⅛	0 0	0	52 6	11	0 0	0	52 0	10¾	0 0	0	53 0	11½
Lower Studding Boom	50 0	10	29 0	5¾	45 6	9⅛	26 0	5¼	44 6	9	25 6	5⅛	45 0	9	26 0	5¼
Main Top Boom	45 0	9	25 9	5⅛	41 0	8⅛	23 6	4¾	40 0	8	23 0	4¾	41 0	8⅛	23 6	4¾
Main Top Gallant Boom	32 8	6½	18 9	3¾	30 5	6	17 6	3½	28 9	5¾	16 6	3¼	29 6	6	17 0	3½
Fore Top Boom	39 9	8	22 9	4½	36 0	7¼	20 6	4⅛	35 0	7	20 0	4	35 9	7⅛	20 6	4⅛
Fore Top Gallant Boom	28 9	5¼	16 6	3¼	26 3	5¼	15 0	3	26 0	5¼	15 0	3	26 6	5¼	15 0	3
Enfign Staff	38 0	6¼	0 0	0	36 0	6	0 0	0	35 0	5⅝	0 0	0	35 0	5⅝	0 0	0
Jack Staff	16 6	4¼	0 0	0	15 6	3¾	0 0	0	15 6	3¾	0 0	0	15 6	3¾	0 0	0
Fire Boom	33 3	10	0 0	0	30 0	9⅛	0 0	0	29 6	9	0 0	0	30 0	9	0 0	0

Dimensions of Masts and Yards in the Royal Navy.

NAMES OF THE MASTS AND YARDS.	36 GUNS. 871 TONS.				32 GUNS. 677 TONS.				28 GUNS. 594 TONS.				24 GUNS. 500 TONS.			
	MASTS.		YARDS.		MASTS.		YARDS.		MASTS.		YARDS.		MASTS.		YARDS.	
	Length Ft. In.	Dia. Inc.	Length Ft. In.	Dia. Inc.	Length Ft. In.	Dia. Inc.	Len. F. I.	Dia. Inc.	Length Ft. In.	Dia. Inc.	Len. F. I	Dia. Inc.	Length Ft. In.	Dia. Inc.	Len. F. I.	Dia In.
Main — — —	89 0	26	79 0	18⅝	85 0	24¾	74 4	17⅛	81 4	23⅝	71 3	16½	75 0	22¼	65 6	15
Main Top — — —	53 4	15¾	57 0	12	51 0	15⅛	55 0	11⅜	48 9	14⅜	52 0	11	45 0	13¼	47 0	9¾
Main Top Gallant — —	25 8	8⅝	34 9	7	25 6	8½	33 6	6⅝	24 4	8	32 6	6½	22 6	7½	29 6	6
Main Top Gallant Royal —	0 0	0	28 0	6	0 0	0	27 0	5⅝	0 0	0	26 0	5½	0 0	0	23 6	4⅞
Fore — — — —	79 6	23⅜	69 4	16	75 0	22	65 0	15	72 0	20⅞	62 2	14½	66 6	19½	57 8	13¼
Fore Top — — — —	47 0	15¾	51 9	11	45 0	15⅛	48 0	10	43 0	14⅜	46 0	9¾	40 0	13¼	41 0	8⅝
Fore Top Gallant — —	22 5	7½	31 6	6⅜	22 6	7½	29 6	5⅞	21 6	7	28 6	5⅝	20 0	6½	25 10	5⅜
Fore Top Gallant Royal —	0 0	0	25 0	5½	0 0	0	24 0	5	0 0	0	23 0	4⅞	0 0	0	20 6	4⅜
			Gaff				Gaff				Gaff				Gaff	
Mizen — — — —	74 8	17¾	36 0	11	72 0	17	35 0	10	69 0	16¾	32 6	9¾	64 0	15	29 4	8⅝
Mizen Top — — —	40 0	11⅛	39 4	7⅞	38 0	10⅝	36 9	7	36 7	10	35 0	7¼	33 9	9¼	31 5	6½
Mizen Top Gallant — —	20 0	6½	27 0	5½	19 0	6¼	24 0	5	18 3	6	22 0	4⅜	16 10	5½	19 6	4
Mizen Top Gallant Royal —	0 0	0	19 0	3⅞	0 0	0	18 0	3½	0 0	0	17 6	3⅝	0 0	0	15 8	3¼
			Sprit	sail			Sprit	sail			Sprit	sail			Sprit	sail
Bowsprit — — — —	54 0	26	51 9	11	52 0	25	48 0	10	48 9	23⅝	46 0	9¾	45 0	22¼	41 0	8⅝
			Sp. Top	sail			Sp. T	opſ.			Sp. T	opſ.			Sp. To	pſ.
Jib Boom — — —	38 0	11¼	31 6	6⅜	36 10	10¾	29 6	5⅞	35 0	10¼	28 6	5⅝	32 6	9⅜	25 10	5⅜
Driver Boom — — —	57 0	11	31 6	6⅜	55 0	10	29 6	5⅞	52 0	9¾	28 6	5⅝	47 0	8⅝	25 10	5⅜
Croſs Jack — — —	0 0	0	51 9	11	0 0	0	48 0	10	0 0	0	46 0	9¾	0 0	0	41 0	8⅝
Lower Studding Boom —	44 0	9	25 6	5⅛	41 0	8¾	23 6	4¾	40 0	8	23 0	4⅝	36 9	7¼	21 0	4¼
Main Top Boom — —	39 6	8	22 6	4½	37 2	7½	21 3	4¼	36 0	7⅛	20 6	4	33 0	6½	19 0	3⅞
Main Top Gallant Boom —	28 6	5¾	16 6	3¼	27 6	5½	16 0	3¼	26 0	5¼	15 0	3	23 6	4¾	13 ½	2¾
Fore Top Boom — —	34 8	7	20 0	4	32 6	6½	18 6	3¾	31 1	6⅞	17 9	3½	[illegible] 10	5¾	16 6	3¼
Fore Top Gallant Boom —	25 10	5⅛	15 0	3	24 0	4⅞	14 0	2⅞	23 0	4⅝	13 3	2⅝	20 6	4⅛	[illegible] 9	2⅛
Enſign Staff — — —	35 0	5⅝	0 0	0	34 0	5½	0 0	0	30 0	5¼	0 0	0	28 0	5	0 0	0
Jack Staff — — —	15 6	3¾	0 0	0	15 0	3¾	0 0	0	14 0	3⅜	0 0	0	13 0	3¼	0 0	0
Fire Boom — — —	29 3	9	0 0	0	27 3	8¾	0 0	0	26 6	8	0 0	0	24 0	7¼	0 0	0

	20 GUNS. 429 TONS.				SLOOPS of 300 TONS.				BRIGS of 200 TONS.				CUTTERS of 200 T.			
Main — — — —	72 0	21⅝	63 0	14½	63 0	18⅜	55 0	12¾	56 0	19	42 0	9¾	& Top	Maſt	58 0	9½
Main Top — — — —	43 2	12¾	45 6	9½	37 6	11¼	39 6	8¼	31 0	10	31 6	7	88 0	22	52 0	7½
Main Top Gallant —	21 7	7¼	28 4	5¾	18 9	6¼	25 0	5	23 6	6¼	23 6	5	44 0	9¾	26 0	6
													D° Sho	rt		
Main Top Gallant Royal —	0 0	0	22 9	4¾	0 0	0	19 9	4⅛	0 0	0	15 9	3½	35 0	9½	13 0	3¾
Fore — — — —	64 0	19	55 0	12⅝	56 0	16⅜	48 5	11¼	49 0	17	42 0	9¾	Bow	ſprit		
Fore Top — — — —	38 4	12¾	40 0	8½	33 4	11¼	35 0	7⅜	31 0	10	31 6	7	64 0	20	0 0	0
Fore Top Gallant —	19 2	6⅜	25 0	5	16 8	5⅝	22 0	4⅜	23 6	6¼	23 6	5	Jib B	oom		
Fore Top Gallant Royal —	0 0	0	20 0	4¼	0 0	0	17 6	3¾	0 0	0	15 0	3½	57 0	10	0 0	0
Mizen — — —	61 0	14	28 6	8½	48 0	12	24 9	7⅜					Main B	oom		
Mizen Top — — —	32 5	9	31 0	6¼	26 9	7¾	26 4	5½					66 0	14¾	0 0	0
Mizen Top Gallant — —	16 0	5¼	19 6	4	13 0	4¼	16 6	3¼					Driver	Boo.		
Mizen Top Gallant Royal —	0 0	0	15 6	3⅛	0 0	0	13 2	2¾					42 0	8	0 0	0
			Sprit	ſail			Sprit	ſail					Ga	ff		
Bowſprit — — — —	43 6	21⅝	40 0	8½	37 6	18⅜	35 0	7⅜	34 0	17	31 6	7	49 6	10¾	0 0	0
			Sp. Top	ſail			Sp. T	opſ.					Storm	Gaff		
Jib Boom — — — —	31 0	9	25 0	5	27 0	8	22 0	4⅜	24 0	7	23 6	5	21 0	8¾	0 0	0
									Main B	oom						
Driver Boom — — —	45 6	8½	25 0	5	39 6	7⅜	22 0	4⅜	45 0	10½	0 0	0				
									Ga	ff						
Croſs Jack — — —	0 0	0	40 0	8½	0 0	0	35 0	7⅜	28 0	7¼	0 0	0				
Lower Studding Boom —	35 0	7	20 0	4	30 6	6	17 6	3½	23 6	4¾	13 6	2¾				
Main Top Boom — —	32 0	6⅜	18 6	3¾	27 0	5⅜	15 6	3⅛	21 0	4⅛	12 0	2½				
Main Top Gallant Boom —	22 6	4½	13 0	2⅝	19 9	4	11 6	2¼	11 9	2¼	6 9	2				
Fore Top Boom — —	27 6	5½	15 9	3⅛	24 2	5	14 0	2⅞	21 0	4⅛	12 0	2½				
Fore Top Gallant Boom —	20 0	4	11 6	2¼	17 6	3½	10 0	2	11 9	2¼	6 9	2				
Enſign Staff — — —	28 0	5	0 0	0	24 0	4½	0 0	0	20 0	3½	0 0	0				
Jack Staff — — — —	13 0	3¼	0 0	0	12 0	3	0 0	0	10 0	2½	0 0	0				
Fire Boom — — —	23 6	7	0 0	0	20 6	6	0 0	0	0 0	0	0 0	0				

N.B. The Depth in Hold is added to the Length and Breadth, and ½ is the Length of the Main Maſt.

Brigs may be maſted by this Proportion.

N.B. Let the Length of the Deck, Breadth extreme, and Depth in Hold, be added together, and ¾ of that Sum taken for the Length of the Maſt.

Cutters may be maſted by this Proportion.

NAMES OF THE MASTS AND YARDS.	1300 TONS.				1200 TONS.				1100 TONS.				1000 TONS.			
	Masts.		Yards.		Masts.		Yards.		Masts.		Yards.		Masts.		Yards.	
	Length Ft. In.	Dia. Inc.	Length Ft. In.	Dia. Inc.	Length Ft. In.	Dia. Inc.	Len. F. I.	Dia. Inc.	Length Ft. In.	Dia. Inc.	Len. F. I.	Dia. Inc.	Length Ft. In.	Dia. Inc.	Len. F. I.	Dia. Inc.
Main — — —	96 0	31½	86 0	21	94 0	31	84 0	20½	90 0	30	80 0	20	87 0	29	78 0	19
Main Top — —	56 0	17½	58 0	14	56 0	17½	58 0	14	56 0	17¼	57 6	13½	52 0	16½	54 0	13
Main Top Gallant —	27 0	9	38 0	8½	27 0	9	37 6	8¼	27 0	9	37 0	8	26 0	9	36 0	8
Main Top Gallant Royal —	20 0	6½	24 0	5	20 0	6½	24 0	5	20 0	6½	23 0	5	19 0	6½	22 0	5
Fore — — —	90 0	30	82 0	20	88 0	30	80 0	19½	84 0	29½	76 0	18½	81 0	29	72 0	18
Fore Top — — —	56 0	17½	56 0	13½	54 0	17½	54 0	13¼	52 0	17¼	52 0	13	50 0	16½	52 0	12½
Fore Top Gallant — —	26 0	9	36 0	8	26 0	9	36 0	8	26 0	9	36 0	7¾	24 0	9	34 0	7½
Fore Top Gallant Royal —	18 0	6	22 0	5	18 0	6	22 0	5	18 0	6	21 0	5	17 0	6	20 0	4½
Mizen — — —	78 0	21½	72 0	13	78 0	21½	70 0	13	78 0	21	68 0	13	76 0	20	66 0	12½
Mizen Top — —	41 0	13	40 0	9½	40 0	12½	39 0	9¼	39 0	12	38 0	9	38 0	12	38 0	9
Mizen Top Gallant —	21 0	7	26 0	5½	21 0	7	26 0	5½	20 0	6½	26 0	5	19 0	6½	26 0	5½
Mizen Top Gallant Royal —	12 0	5	16 0	4½	12 0	5	16 0	4½	12 0	5	16 0	4½	10 0	4½	14 0	4
Bowſprit — — —	60 0	31	56 0	11½	59 0	30½	55 0	11¼	58 0	30	54 0	11¼	54 0	29	54 0	11¼
Jib Boom — — —	44 0	12½	38 0	8	42 0	12¼	38 0	8	40 0	12	38 0	8	40 0	12	36 0	8
Driver Boom — —	62 0	12	0 0	0	60 0	11½	0 0	0	58 0	11	0 0	0	57 0	11	0 0	0
Croſs Jack — — —	0 0	0	56 0	11½	0 0	0	55 0	11¼	0 0	0	54 0	11¼	0 0	0	54 0	11¼
Lower Studdingſail Boom —	44 0	9	30 0	7	42 0	9	29 0	7	41 0	9	28 0	7	40 0	8¾	28 0	7
Main Top Ditto — —	43 0	8½	24 0	6	41 0	8½	23 0	6	40 0	8½	22 0	6	39 0	8¼	22 0	5¾
Main Top Gallant Ditto —	29 0	6	18 0	5	28 0	6	17 0	5	27 0	6	16 0	5	27 0	6	15 0	5
Fore Top Boom — —	41 0	8½	24 0	6	39 0	8½	23 0	6	37 0	8½	22 0	6	36 0	8½	22 0	5¾
Fore Top Gallant Ditto —	27 0	6	17 0	5	26 6	5¾	16 0	5	26 0	5½	14 0	5	26 0	5½	14 0	5
Enſign Staff — —	40 0	7	0 0	0	38 0	7	0 0	0	36 0	6½	0 0	0	36 0	6½	0 0	0
Jack Staff — — —	20 0	5½	0 0	0	24 0	5	0 0	0	24 0	5	0 0	0	22 0	5	0 0	0
Fire Boom — —			None				None				None				None	

	900 TONS.				800 TONS.				700 TONS.				600 TONS.			
	Masts.		Yards.		Masts.		Yards.		Masts.		Yards.		Masts.		Yards.	
	Length	Dia.	Length	Dia.	Length	Dia.	Len.	Dia.	Length	Dia.	Len.	Dia.	Length	Dia.	Len.	Dia.
Main — — —	86 0	28	76 0	18½	84 0	27	74 0	18	82 0	26	70 0	16½	78 0	24	62 0	15½
Main Top — —	50 0	16	52 0	12½	49 0	16	50 0	12	48 0	15½	50 0	12	48 0	15	48 0	12
Main Top Gallant — —	26 0	9	34 0	8	25 9	9	33 6	8	24 0	8½	32 0	7½	23 0	8	32 0	7½
Main Top Gallant Royal —	19 0	5½	21 0	4½	18 0	5	20 0	4½	0 0	0	0 0	0	0 0	0	0 0	0
Fore — — —	79 0	28	70 0	17	77 0	27	68 0	16	75 0	26	64 0	15	73 0	23½	58 0	14½
Fore Top — — —	48 0	16	50 0	12	47 0	16	48 0	12	46 6	15½	48 0	12	46 0	15	46 0	11½
Fore Top Gallant — —	23 0	9	32 0	7½	22 0	8½	30 0	7½	22 0	8½	30 0	7½	22 0	8	30 0	7½
Fore Top Gallant Royal —	17 0	5½	19 0	4½	16 0	4½	18 0	4½	0 0	0	0 0	0	0 0	0	0 0	0
Mizen — — —	76 0	20	64 0	12	73 0	19	62 0	10½	70 0	18	62 0	10½	68 0	16	60 0	10½
Mizen Top — —	37 0	12	35 0	8½	36 0	12	34 0	8½	34 0	11	34 0	8½	30 0	10½	32 0	8
Mizen Top Gallant —	19 0	6	23 0	5	19 0	6	23 0	5	18 0	5½	23 0	5	18 0	5½	22 0	4½
Mizen Top Gallant Royal —	0 0	0	0 0	0	0 0	0	0 0	0	0 0	0	0 0	0	0 0	0	0 0	0
Bowſprit — — —	54 0	28	50 0	10½	53 0	27	50 0	10½	50 0	25	48 0	9½	50 0	24½	48 0	9½
Jib Boom — —	40 0	12	36 0	8	38 0	12	34 0	7½	36 0	10½	32 0	7	36 0	10½	32 0	7
Driver Boom — —	50 0	10½	0 0	0	49 0	10½	0 0	0	50 0	10½	0 0	0	50 0	10½	0 0	0
Croſs Jack — — —	0 0	0	52 0	10½	0 0	0	50 0	10½	0 0	0	49 0	10	0 0	0	48 0	9½
Lower Studdingſail Boom —	37 0	8½	25 0	6½	36 0	8	23 0	6	35 0	8	22 0	5½	34 0	8	20 0	5
Main Top Ditto — —	35 0	8	20 0	5½	34 0	8	18 0	5½	33 0	7½	17 0	5	32 0	7½	16 0	5
Main Top Gallant Ditto —	25 0	6	14 0	5	25 0	5½	14 0	4½	24 0	5½	13 0	4	24 0	5½	12 0	4
Fore Top Boom — —	34 0	8½	19 0	6	33 0	8	17 0	5½	31 0	7½	16 0	5	30 0	7½	15 0	5
Fore Top Gallant Ditto —	25 0	5½	14 0	5	24 0	5½	14 0	4½	23 0	5½	13 0	4	22 0	5½	12 0	4
Enſign Staff — —	34 0	6½	0 0	0	34 0	6½	0 0	0	32 0	6½	0 0	0	30 0	6½	0 0	0
Jack Staff — — —	22 0	4½	0 0	0	22 0	4½	0 0	0	21 6	4½	0 0	0	21 0	4½	0 0	0
Fire Boom — —			None				None				None				None	

NAMES OF THE MASTS AND YARDS.	500 TONS.				400 TONS.				360 to 350 TONS.				330 to 300 TONS.			
	MASTS.		YARDS.		MASTS.		YARDS.		MASTS.		YARDS.		MASTS.		YARDS.	
	Length Ft. In.	Dia. Inch.	Length Ft. In.	Dia. Inch	Length Ft. In.	Dia. Inc.	Len. F. I.	Dia. Inc.	Length Ft. In.	Dia. Inc.	Len. F. I.	Dia. Inc.	Length Ft. In	Dia. Inc.	Len. F. I	Dia. Inc.
Main — — —	72 0	22	52 0	13	70 0	21½	50 0	13	68 0	20½	48 0	12	66 0	19	47 0	12
Main Top — —	43 0	14	41 0	10½	41 0	13	39 0	10	39 0	12½	36 0	9	38 0	12	35 0	9
Main Top Gallant — —	23 0	8	31 0	7	23 0	7½	29 0	6½	20 0	7	28 0	6½	19 0	6½	26 0	6
Main Top Gallant Royal —	15 0	5	20 0	5	15 0	5	20 0	5	14 0	5	18 0	5	13 0	4½	16 0	4
Fore — — —	67 0	22	52 0	12½	65 0	21	49 0	12½	63 0	20½	47 0	12	61 0	19	45 0	11½
Fore Top — —	41 0	14	41 0	10½	40 0	13	39 0	10	38 0	12½	35 0	9	37 0	12	32 0	8½
Fore Top Gallant — —	22 0	8	28 0	6½	21 0	7½	27 0	6	19 0	7	27 0	6½	18 0	6½	25 0	5¾
Fore Top Gallant Royal —	14 0	5	19 0	5	14 0	5	19 0	4½	13 0	5	17 0	4½	12 0	4½	15 0	4
			Gaff				Gaff				Gaff				Gaff	
Mizen — — —	63 0	15	32 0	8	62 0	15	30 0	7½	60 0	14	28 7	7	58 0	13	26 0	6½
Mizen Top — —	30 0	10	32 0	8	30 0	9½	30 0	7½	30 0	9½	30 0	7½	28 0	9	28 0	7
Mizen Top Gallant — —	17 0	5½	21 0	5	16 0	5	20 0	5	16 0	5	18 0	5	15 0	4½	16 0	4
Bowsprit — — —	48 0	23	39 0	8½	47 0	21	36 0	7½	44 0	20½	34 0	7½	42 0	19	30 0	7
Jib Boom — — —	35 0	10	0 0	0	34 0	10	0 0	0	34 0	9½	0 0	0	33 0	9	0 0	0
Driver Boom — —	46 0	9	0 0	0	40 0	8½	18 0	5½	38 0	8	22 0	5½	38 0	7½	20 0	5
Cross Jack — — —	0 0	0	44 0	9	0 0	0	39 0	8	0 0	0	36 0	7½	0 0	0	35 0	7
Lower Studdingsail Boom —	30 0	7½	19 0	5	28 0	7	18 0	5	26 0	6½	16 0	4½	25 0	6	15 0	4½
Main Top Ditto — —	28 0	7	15 0	4½	26 0	6½	15 0	4½	25 0	6	14 0	4	24 0	5¾	12 0	4
Main Top Gallant Ditto —	22 0	5	12 0	4	20 0	5	12 0	4	19 0	4½	10 0	3½	18 0	4¼	10 0	3½
Fore Top Boom — —	28 0	7	15 0	4½	25 0	6½	15 0	4½	24 0	6	14 0	4	23 0	5¾	12 0	4
Fore Top Gallant Ditto —	20 0	5	12 0	4	19 0	5	12 0	4	18 0	4½	10 0	3½	19 0	4¼	10 0	3½
Ensign Staff — —	30 0	6	0 0	0	28 0	6	0 0	0	28 0	6	0 0	0	26 0	5½	0 0	0
Jack Staff — — —	20 0	5	0 0	0	20 0	5	0 0	0	14 0	4	0 0	0	13 0	4	0 0	0
Fire Boom — —			None				None				None				None	

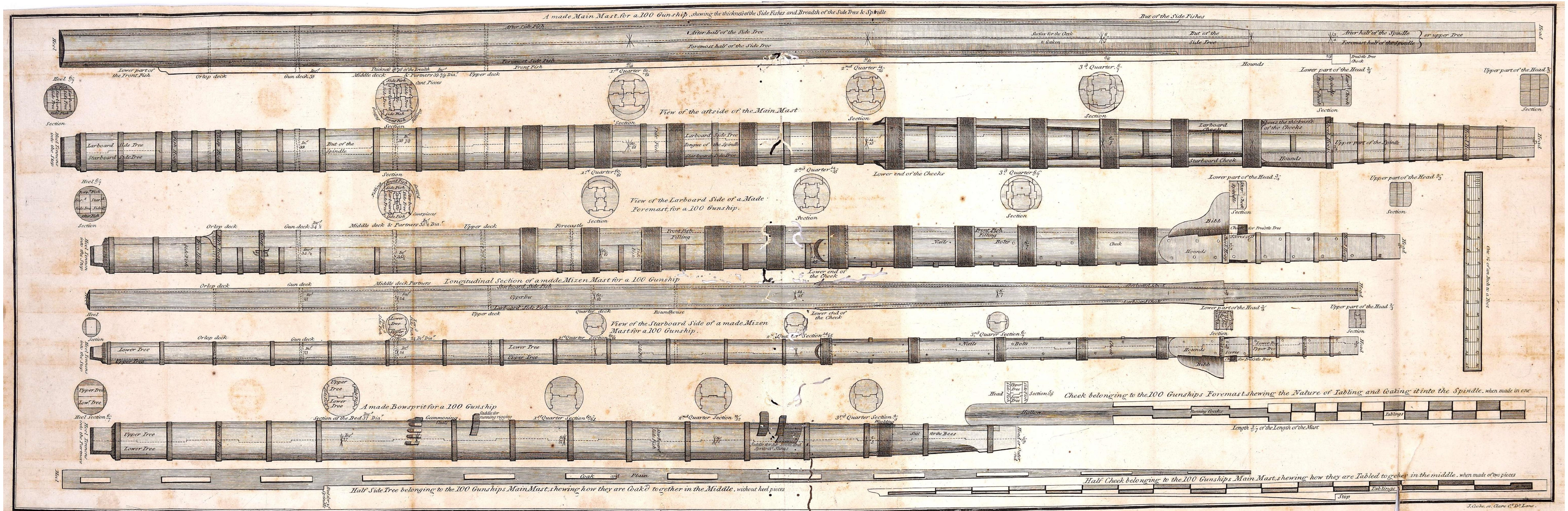
	280 to 250 TONS.				BRIGS, 150 TONS.				KETCH, 170 TONS.			
	MASTS.		YARDS.		MASTS.		YARDS.		MASTS.		YARDS.	
	Length	Dia.	Length	Dia.	Length	Dia.	Len.	Dia.	Length	Dia.	Len.	Dia.
Main — — —	61 0	18	44 0	11	60 0	16½	38 0	9½	72 0	19	51 0	12
Main Top — —	36 0	11	32 0	8	30 0	10	30 0	7½	36 0	10½	36 0	7½
Main Top Gallant —	18 0	6	23 0	5½	16 6	5½	21 0	4½	20 0	4½	24 0	4
Main Top Gallant Royal —	12 0	4½	15 0	4	0 0	0	0 0	0	0 0	0	0 0	0
Fore — — —	58 0	18	42 0	10½	54 0	16½	36 0	9	0 0	0	0 0	0
Fore Top — —	35 0	11	32 0	8	32 0	10	30 0	7½	0 0	0	0 0	0
Fore Top Gallant — —	17 0	6	23 0	5½	16 0	5½	21 0	4½	0 0	0	0 0	0
Fore Top Gallant Royal —	11 6	4½	15 0	4	0 0	0	0 0	0	0 0	0	0 0	0
			Gaff					Gaff			Gaff	
Mizen — — —	54 0	12	25 0	6	0 0	0	0 0	0	49 0	10	18 0	5½
Mizen Top — —	26 0	8	27 0	6	0 0	0	0 0	0	30 0	5½	21 0	4
Mizen Top Gallant —	14 0	5	0 0	0	0 0	0	0 0	0	0 0	0	0 0	0
Bowsprit — — —	38 0	18	32 0	7	32 0	16	30 6	6	44 0	14½	31 0	6
Jib Boom — — —	32 0	8	0 0	0	26 7	7	0 0	0	28 0	7¾	0 0	0
Driver Boom — —	36 0	7½	18 0	5	34 0	8½	MainBoom		0 0	0	0 0	0
Cross Jack — — —	0 0	0	32 0	7	18 6	6	Gaff		Cross Jack		29 0	5½
Lower Studdingsail Boom —	0 0	0	0 0	0	0 0	0	0	0	Trysail.		16 0	5
Main Top Ditto — —	23 0	5	12 0	4	26 0	4½	10	3½	Gaff or Wingsail.			
Main Top Gallant Ditto —	0 0	0	0 0	0	0 0	0	0	0	Sprit.		16 0	5
Fore Top Boom — —	22 0	5	12 0	4	19 0	4½	10	3½	0 0	0	0 0	0
Fore Top Gallant Ditto —	0 0	0	0 0	0	0 0	0	0	0	0 0	0	0 0	0
Ensign Staff —	25 0	5½	0 0	0	23 0	4½	0	0	22 0	4	0 0	0
Jack Staff — — —	10 0	3	0 0	0	9 0	3	0	0	8 0	3	0 0	0
Fire Boom — —			None				None				None	

SCHOONERS, 110T.

MASTS AND YARDS.	L. Ft	Dia In
Main Mast -	75	15
TopGall. Mast -	32	7½
Topsail Yard -	38	6
Spread Yard -	47	7
TopGall. Yard -	27	5½
SquareSailYard	38	7½
Fore Mast -	66	15
TopGall. Mast -	26	6½
Topsail Yard -	30	6½
TopGall. Yard -	25	5
Spread Yard -	40	7
Gaff - - -	22	6½
Bowsprit - -	50	14½
Boom - - -	47	10½
Gaff - - -	28	7

SLOOP, 70 TONS.

Main Mast -	64	16
TopGall. Mast -	30	6½
Squ. S or Cs Jack	40	8
Topsail Yard -	24	6
Bowsprit - -	40	14
Jib Boom -	32	6½
Main Boom -	48	10
Gaff - - -	28	7



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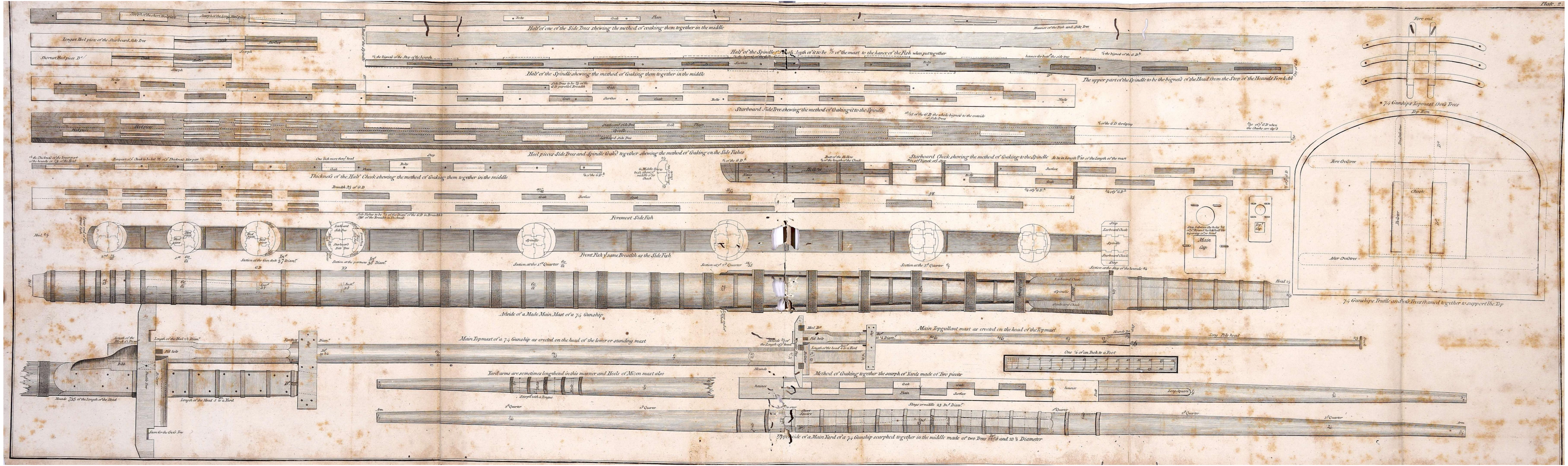
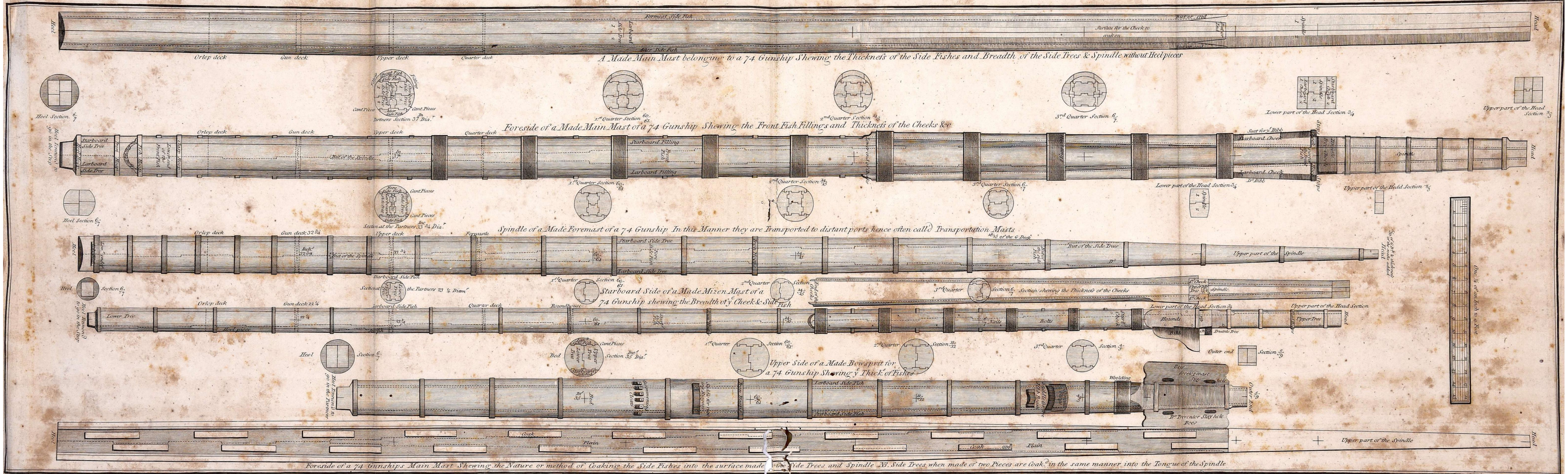

Half of one of the Side Trees shewing the method of coaking them together in the middle
Longest Heel piece of the Starboard Side Tree
Shortest Heel piece Do.
Half of the Spindle shewing the method of coaking them together in the middle
The upper part of the Spindle to be the bigness of the Head from the Stop of the Hounds Fore Aft
Starboard Side Tree shewing the method of coaking it to the Spindle
Heel pieces Side Trees and Spindle coak'd together shewing the method of coaking on the Side Fishes
Thickness of the Half Cheek shewing the method of coaking them together in the middle
Starboard Cheek shewing the method of coaking to the Spindle
Foremost Side Fish
Section at the Gun deck
Section at the partners
Section at the 1st Quarter
Front Fish of same Breadth as the Side Fish
Section at the 2nd Quarter
Section at the 3rd Quarter
Section at the Stop of the hounds
Main Cap
A Side of a Made Main Mast of a 74 Gunship
Main Topmast of a 74 Gunship as erected on the head of the lower or standing mast
Main Topgallant mast as erected on the head of the Topmast
Yard arms are sometimes lengthend in this manner and Heels of Mizen mast also
Method of Coaking together the scarph of Yards made of Two pieces
One Side of a Main Yard of a 74 Gunship scarphed together in the middle made of two Trees
74 Gunships Topmast Cross Trees
Fore end
Fore CrossTree
After CrossTree
Cheek
Bolster
74 Gunships Trustle and Cross Trees framed together to support the Top
One ¼ of an Inch to a Foot



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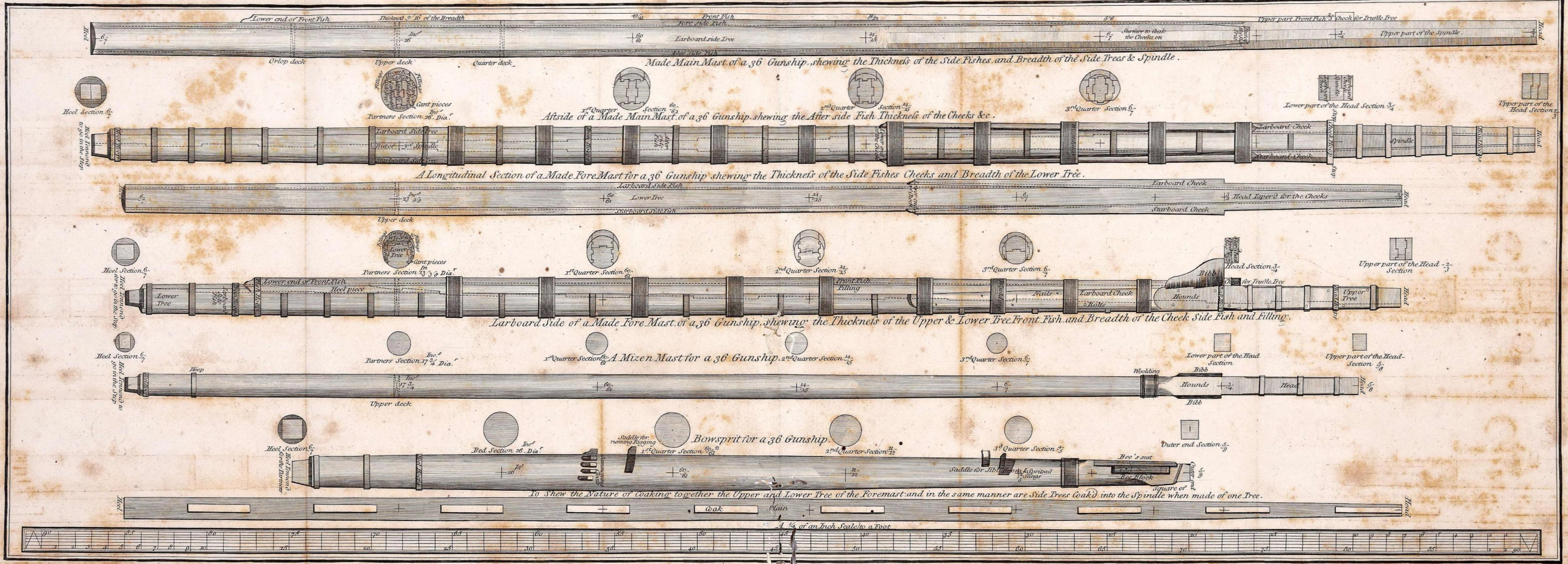
J. Cooke. sc. Mill Hill. Midd.x from Clm



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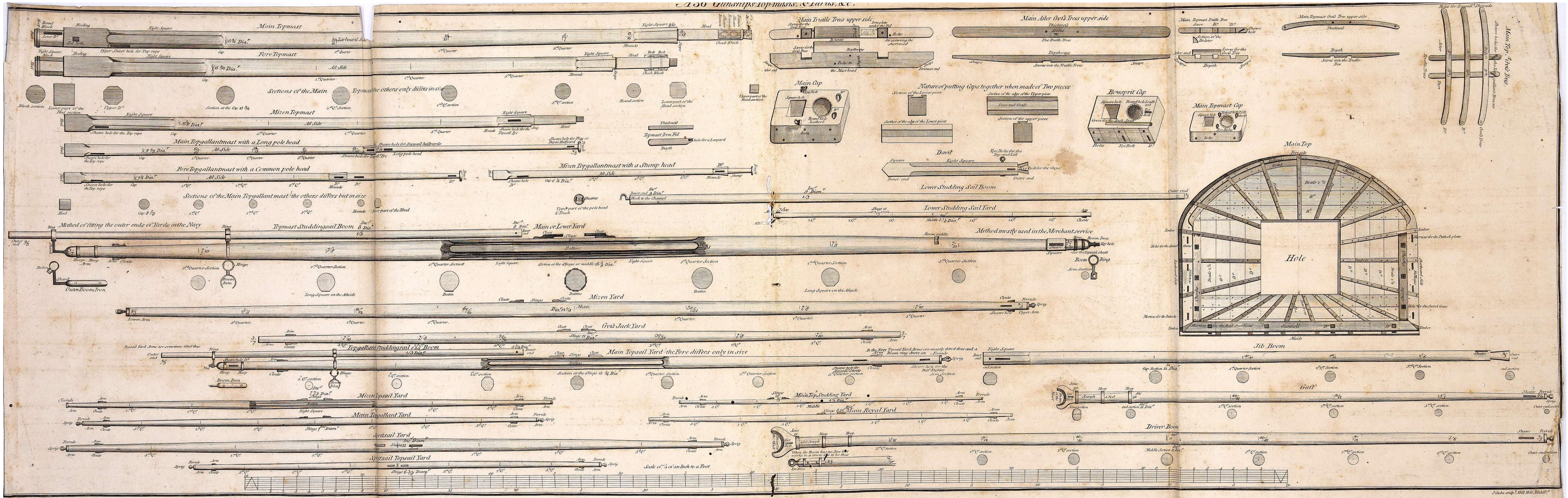
J. Cooke sc. Mill Hill Midd.x from Clare Court

A 36 Gunships Top-masts, & Yards, &c.



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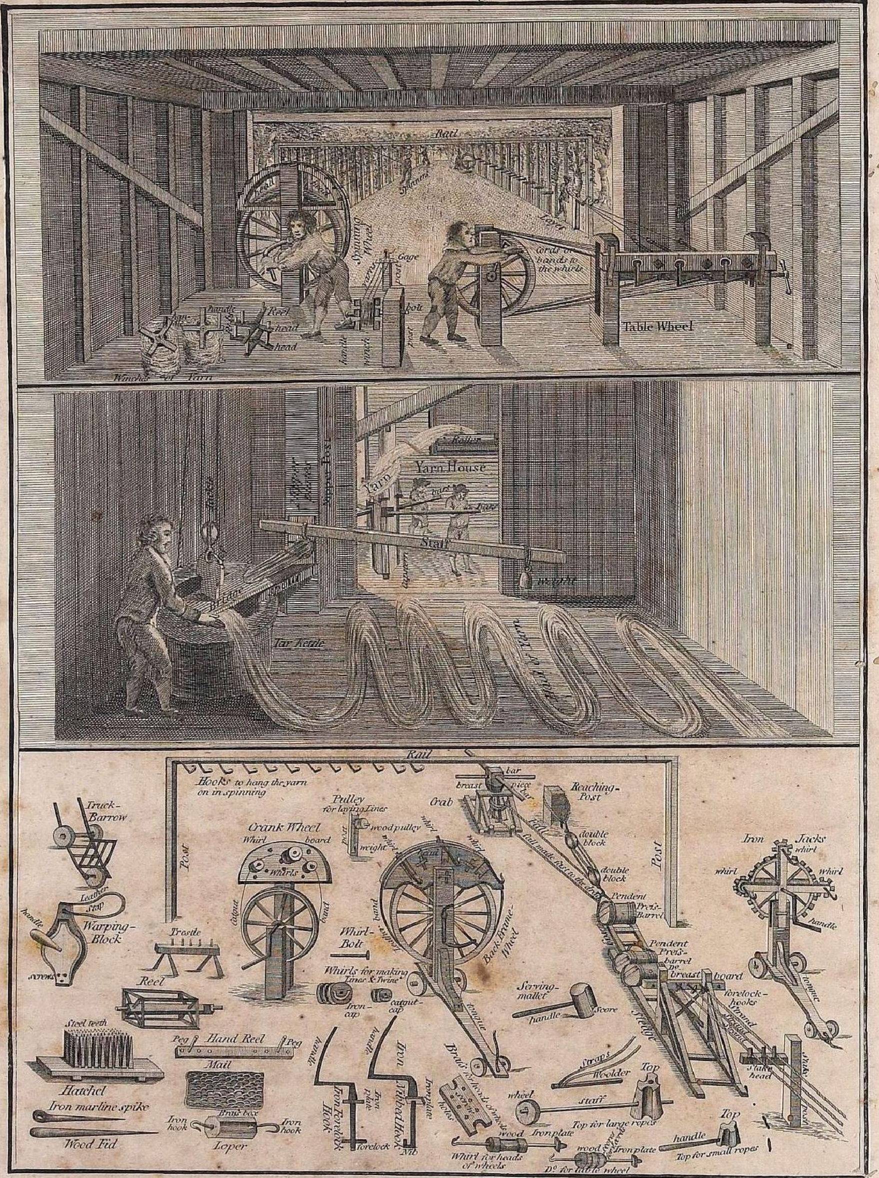
J Cooke sculp.t Mill Hill Middl.x

ROPE-MAKING.

Practice of Ropemaking with the Tools.



J. Cooke sc. Mill Hill Midd.x

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THE

ELEMENTS AND PRACTICE OF ROPE-MAKING.

The ſubject of Rope-making having never hitherto been fully treated on, every attention has been beſtowed to render the following explanations clear and explicit. And it is hoped that a reference to the Plates, connected with the deſcriptive Practice of Rigging, and the other parts of this treatiſe, will afford a ſatisfactory, diſtinct, and accurate, account of the ſeveral operations.

AN ALPHABETICAL DESCRIPTION OF THE TOOLS AND EXPLANATION OF THE TERMS USED IN ROPE MAKING.

BACK-FRAME WHEEL for laying cordage, from a ſix-thread ratline to a two-inch rope, is about four or five feet in diameter, and is hung between two uprights, fixed by tenons on a truck, and ſupported by a knee of wood. Over its top is a ſemi-circular frame, called the head, to contain three whirls (that turn on the braſſes) with iron ſpindles, ſecured by a haſp and pin. They are worked by means of a leather band encircling the whirls and wheel. Three of the whirls are turned when hardening the ſtrands, and one only when cloſing the rope, the ſtrands being hung together on it. The truck, on which the back-frame wheel is fixed, runs on four wheels, and is made of three-inch oak plank, about nine feet long and thirteen inches broad, at one end, and eleven inches broad at the other.

BACK-HOOKS, large ſtrong iron hooks, to cloſe ropes and cables, fixed in the breaſt-board of the ſledge.

BANDS, to encircle the wheels and whirls, are of leather, large line, or catgut. The leather is for the ſpinning and back-frame wheels, the line for the table-wheel, and the catgut for line and twine wheels.

BLOCKS, ſingle, double, or treble, are ſtrapped with a hook and thimble, and reeved with a rope, called the tackle-fall, which is uſed to ſtretch the yarn to its full extent, (before the preſs is put on,) by a capſtern, or crab, at the lower-end of the rope-walk. The fall is then belayed, until every yarn is hove through the ſtrands and brought down, ſo that the rope may not exceed the circumference intended.

BOLTS for whirls are large iron pins with round heads driven in the board over the crank-wheel for the whirls to run on.

BRASSES, let into the heads of laying or ſpinning wheels, are about four inches long and two broad. In the middle of the upper-end is a hole for theſpindle of the whirls to work in.

BRIDGE, an oak plank, thirty-two inches broad and three thick, fixed acroſs the top of the kettle, with a mortiſe through the middle to admit the ſtep, and a hole at the end for the yarn to paſs through to the nipper.

CABLES, ropes made of nine ſtrands, that are nine inches and upwards in circumference.

CABLETS, cable-laid ropes, under nine inches in circumference.

CAPSTERN. A round body of wood, about eight feet high and fourteen-inches in diameter. It turns on a ſpindle at top and bottom, has four holes near the middle for levers or bars, and is turned by men or horſes. Its uſe is to draw the yarn, when tarring, out of the copper through the nipper, to be coiled away in the yarn-houſe, and there properly hardened before uſed; if not, it will kink in cloſing.

A CAPSTERN, or CRAB, is fixed in the ground at the lower-end of the walk, and is uſed in ſtretching the yarn to its fulleſt extent, before it is worked into ſtrands, by means of the tackle-fall, led from the ſledge to the capſtern, they being about eighteen yards diſtant from each other.

CLEARER. A tool ſimilar to the hatchell, but with finer teeth, as the hemp is always finiſhed on it for lines and twines, for ſail-makers, &c.

CLOSING of ropes, ſee LAYING.

COUCH. To couch well is to lay cloſe and even.

COIL. A rope turned in form of a ring, one turn upon another, for eaſy ſtowage, and that it may run out free.

CRAB, a ſort of ſmall capſtern, fixed in a frame of wood at the lower-end of the ground, uſed to ſtretch the yarn, by giving power to the tackle.

CRANK-WHEEL, for ſpinning of lines, box-cord, &c. is fixed on an iron ſpindle or axis with a handle to turn it by: It hangs between two poſts; the after one is ſix feet high, one foot broad, and five inches thick; in its upper part, above the wheel, is let in a ſemi-circular board, two feet ſix inches long, two feet broad, and five inches thick, to receive three ſets of whirl-bolts, with whirls on them, for the ſpinners to hang their threads on: at the front ſide of the wheel is a ſhort poſt ſupported by a knee of oak for the ſpindle to reſt on.

DRAGS are formed like the after part of the ſledge, to which they are faſtened by ropes, and are lined with a board on the upper ſide. They contain weight, as a preſs, when the rope requires more than the ſledge can carry to keep the ſtrands of a proper ſtretch, and prevent their kinking, as they get hard, and as the rope is brought to its intended ſize.

FIDS, to make eyes, ſplices, &c. in large ropes, are round lignum-vitæ pins, thick at one end and tapering to a point. They are from eight to twenty inches long.

FOREGANGER, a ſhort piece of rope, one quarter of an inch in circumference, (larger than a whale-line,) to fix on the harpoon when they ſtrike a whale.

FORE-LOCK-HOOKS are made of iron, with a long neck and handle; they have an eye at the end of the neck for the fore-lock to go through, and are to hang the yarn on, to harden and cloſe ropes, from two-inches and a quarter and upwards.

GROUND-TOW, the looſe hemp that comes from the ſides of the hatchellers and ſpinners.

A HATCHELL, to clear the ends of the hemp, by drawing it through, has forty ſharp-pointed iron teeth, one foot long, fixed in wood.

HAULED ABOUT is a term uſed in making a ſhort cable-laid rope, when one ſtrand is made long enough to make three; or, for a four ſtrand rope, long enough to make two, and form an eye at the lower end for a ſtay.

A HAUL OF YARN is about four-hundred threads, when warped off the winches, with a ſlight turn in it, to be tarred.

HAWSERS, ropes made of three or four ſingle ſtrands. When made of four ſtrands it is called ſhroud-laid, and is uſed in merchant-ſhips.

HEART, a ſtrand ſlack twiſted, uſed in ſome four-ſtrand ropes: it is run down the middle, to fill the vacancy that would otherwiſe occur, and thereby forms a round. It is beſt hawſer-laid.

IRON JACKS, ſometimes uſed inſtead of the table-wheel or back-frame wheel, differ from the latter by having an iron wheel with cogs, which work in the whirls, they having iron cogs likewiſe.

JUNK, old cables or hawſer-ropes, cut into various lengths.

KINKING, the twiſting or curling of a rope, by being twiſted too hard.

KNITTING, the tying together certain quantities of yarn, when warping into hauls to be tarred.

LAYING, the cloſing of the ſtrands together to compoſe the rope.

LAYING-HOOK, the hook on which the ſtrands are all hung together for laying or cloſing.

LOPER, uſed to lay lines, has two iron ſwivel-hooks (that run round in a braſs or iron box) at each end, for the line to hang on, and work, by the power of the fore turn, from the wheel at the upper end.

MARKING-YARN, a white thread, untarred, laid in rope for the king's or Eaſt-India company's mark. That for the king's is ſpun the contrary way.

MARLINE-SPIKES, to make eyes, ſplices, &c. in ſmall ropes, are long iron pins, in ſhape of a fid, from eight to ſixteen inches long.

MAIL, to rub off the looſe hemp that remains on white cordage, is a kind of ſteel chain-work, flat, and faſtened upon leather, about nine-inches long and ſeven-inches broad.

NIBBED-HOOKS are of iron, uſed to hang the yarn on to harden the ſtrands, and lay ropes from two inches and a quarter to three inches and a quarter.

A NIPPER is formed of two ſteel plates, eight inches ſquare and half an inch thick, with a ſemi-oval hole in each four inches wide, which, by the upper plate moving, enlarges or contracts as the tarring of the yarn requires. It is thus fixed. A poſt, twelve inches ſquare, is placed between the kettle and capſtern, with a mortiſe cut eighteen inches long from the kettle's ſurface and five inches wide. The under-plate is turned up on each ſide, to form two grooves, and is let into the front-ſide of the poſt from the lower part of the mortiſe: the upper-plate has a dove-tail on the back, that ſlides up and down in a groove into the grooves of the lower plate, and, by a ſtaff, made faſt to its front, it is highered or lowered, and regulated by a weight ſuſpended at the other end, ſo that the yarn receives no more tar than is required, and what is ſqueezed out drops in a trough and returns into the kettle.

PENDANTS, ſhort pieces of rope, doubled, with a large eye ſpliced at each end, and a thimble ſeized in the bight, uſed to hook the tackles where wanted.

POSTS AND RAILS, along the whole length of the walk. The poſts are eight feet high, exactly oppoſite to each other, and ſupport, on the head, the rails that croſs the ground, in which are iron hooks for the ſpinner to hang his yarn on as he ſpins it.

PRESS-BARRELS are old tar-barrels filled with clay, and laid on the ſledge or drag to add weight when the rope is cloſing.

RAN, twenty cords of twine, wound on a reel, and every cord ſo parted by a knot as to be eaſily ſeparated.

REACHING-POST, a poſt ſixteen or eighteen inches diameter, and about four feet high, fixed in the ground at the lower-end of the walk. It is uſed in ſtretching the yarn by means of a tackle, one of the blocks of which is hooked to a ſtrap round the poſt, the other block to a pendant at the ſledge, they being about eighteen yards diſtant from each other.

REELS to reel ropes on, from a ſix-thread ratline to a two-inch rope, have four ribs fixed at each end in a flat circular piece of wood; round the edges, are blades, or handles, to turn them: one of the circular pieces is called the head, and is made to ſlide off for taking the coil away. They turn on an iron ſpindle with a round head, and are from ten to thirty-ſix inches long, and from twelve to eighteen inches diameter.

REELS, HAND, are uſed for reeling marline and other lines. They are narrow boards, with three or four holes at each end, in which pegs are fixed to reel the line on.

REELS, TWINE, have four oak bars, about eighteen inches long, one of which ſlides for the conveniency of taking off the twine.

ROPE-HOUSE GROUND, OR WALK, ſhould be four-hundred yards long and about ten broad. At the upper-end are fixed the ſpinning-wheels, over which is the hatchelling-loft, alſo the back-frame wheels, tackle-boards and poſts, winches for winding the yarn on as it is ſpun, and reels for reeling the ropes on. On each ſide are ſtake-poſts: in the middle is fixed the warping-poſt; and, at the lower-end, the capſtern and reaching-poſt. Back-frame wheels for ſmall, and ſledges and drags for large, ropes, are uſed towards the lower-end.

ROUNDING is giving the rope an additional turn after being cloſed.

SERVING-MALLET has a round head, about twelve inches long, to ſerve round the parcelling and ſpunyarn, which is woolded round the rope, to work the worming into the cuntline of the rope.

SERVING of ropes is binding them round with rope-yarn.

SHIVERS. The foul particles taken from the hemp when hatchelling.

SHORT-LAID, implies ſhort-twiſted.

SHORT-HAULS, hauls of yarn for rope ſhort of the common length.

SHORTS. The toppings and tailings of the hemp, which are dreſſed for bolt-ropes and whale-lines. Shorts, alſo, implies the diſtinction between the long hemp uſed in making ſtaple-ropes, and inferior hemp.

SLACK-LAID means ſlack-twiſted.

SLEDGES are frames made of ſtrong oak, clamped with iron in different parts. They are from three feet wide and eight or twelve feet long to five feet wide and fifteen feet long, according to the ſize of the rope. The two ſides are the length of the ſledge, made of oak, five by ſeven inches thick, and tied in with oak bars at each end: near the front are two uprights, five feet high, let into the ſides, and ſupported by two ſlanting pieces from the upper-end. A breaſt-board, nine inches wide and from two to three inches thick, is faſtened with iron pins to the uprights, and contains holes for the hooks to go through on which the yarn is hung, which, being turned by men, is twiſted into rope, and ſo cloſed or finiſhed. Theſe ſledges are loaded to ſuch a degree as the rope in making requires.

SPINNING-WHEEL, for twelve ſpinners, to ſpin yarn at the ſame time, is about five feet in diameter, and is hung between two poſts fixed in the ground: over its top is fixed a ſemi-circular

frame, called the head, which contains twelve whirls, that turn on iron ſpindles, with hooks to their front-ends to hang the hemp on, and are worked by means of a leather band encircling the wheel and whirls.

STAFFS for tops are round, from ſix to eight feet long, and from two and a half to five inches diameter, which go through a hole in the top, or are confined under it by a bolt and tails: they run on a truck-wheel at the lower-end as the rope cloſes.

STAFF for the nipper is an oak bar ſeven feet long and four inches ſquare, one end is fixed in an iron ſtrap on the upper-plate of the nipper; on the other end a weight is ſuſpended ſufficient to preſs the tar out of the yarn.

STAKE-POSTS are of oak, about four feet high and twelve inches diameter, with a mortiſe-hole in each for the ſtake-heads to go in and out, to keep the rope from the ground. They are placed about ten yards diſtant from each other along the whole length of the walk.

STAKE-HEADS are about four feet long and four by three inches ſquare, with four wooden pins to keep the ſtrands aſunder. For lines they are about two feet long and three by two inches ſquare, and have ſix pins.

STAPLE-ROPES, a term for ropes made of hemp not inferior to clean Peterſburgh.

STEP, OR TONGUE, for the tar-kettle, is made of three-inch oak plank, five feet long and thirteen inches broad, which tapers to nine inches at the bottom, and is put into the kettle through a mortiſe in the bridge. Within four inches of the lower-end of the ſtep is a round hole five inches diameter, for the yarn to paſs through. The ſtep is ſuſpended and regulated by a tackle.

STOVING is placing of white rope in an iron ſtove or oven, to which heat is communicated by means of a flue, which makes the rope more limber and pliant to receive the tar.

STRAND, one of the twiſts or diviſions of which a rope is compoſed.

STRAP, a number of yarns platted together with an eye at one end, to put a ſtick through: it is bound round the end of the tails to twiſt them tight when the rope is to be laid hard. Some have a hook at the other end, to hook the ſtrands in laying: others are made of the ſame ſized rope as the pendants, with an eye ſpliced in each end.

STRAPS, pieces of rope ſpliced to ſurround blocks, or faſten large ropes, &c.

TABLE-WHEEL, to lay ropes, from a ſix-thread ratline to a two-inch and half rope, is fixed in the wheel-houſe, at the upper-end of the rope-walk, in a frame fixed in the ground, with two ſliding cheeks, and bands to work the whirls, which go ſeparately over each whirl, and round the turning-wheel. (Some have ſix ſets of whirls, of different ſizes, with iron ſpindles, and nibbed or forelock-hooks at the outer-end.) A tackle-board, twelve inches broad and three inches thick, with ſix holes for the hooks to go through, is fixed above the cheeks upon cleats.

TACKLE-FALL, the rope that connects the blocks together. The whole aſſemblage is called a tackle, and is uſed for ſtretching the yarn, &c.

TAR, a liquid gum of blackiſh hue, which diſtils from pines, or fir-trees: when prepared by boiling, it is uſed in tarring ropes. Stockholm tar is the beſt for this purpoſe, and no other is allowed in the royal navy.

TAR-KETTLE is made of copper, and holds from ten to twenty barrels of tar. It is ſet in ſtrong brick-work, and over it is faſtened, from ſide to ſide, in the direction of the nipper, a bridge made of three-inch oak plank, thirteen inches broad, through the middle of which is a mortiſe for the ſtep to go through to keep the yarn down when drawing through the kettle. On that ſide of the kettle next the capſtern is an upright poſt, twelve inches ſquare, in which is fixed a nipper, to preſs

the tar out of the yarn; and a ſtaff, with a weight ſuſpended at the end, is fixed on the ſide of the nipper, to keep it down, that the yarn may have no more tar than is neceſſary.

TOPS, to lay ropes, from a ſix-thread ratline to the largeſt cables, are conical pieces of wood, with three or four grooves or ſcores from the butt to the end, for the ſtrands to lie in, and form a triangle. If too broad at the breech, the rope will not cloſe well, nor the ſtrands work ſo cloſe as they ſhould. A hole is made through the centre of the top, one-third the length from the biggeſt end, for the ſtaff or bolt to go through, round which are put pieces of old rope, called tails, for the layer to cloſe the rope with, and lay it hard or ſlack, according to the uſe it is for. A hole is likewiſe made through the middle of the top length-ways, for laying ropes with a heart. A collar is put on to aſſiſt the layer when the work is too heavy, and to enable him to hold the tails and cloſe the rope well.

TOPS, to lay ropes of three inches and upwards, have a ſtaff under them, with a truck-wheel at the lower-end. An iron bolt goes through the centre of the top and is laſhed down to the ſtaff, on which the tails are put and rounded over the rope, being too heavy to be laid with the collar. A ſtrap is put round the tails with a woolder for the layer to cloſe the rope with.

TOPS, to lay cables, have a leg to ſupport them with a truck-wheel at the end to run, beſides the ſtaff which the tails go over.

TOPS, for laying lines of all ſizes, are of hard wood, tapered at the after part, that the line may cloſe ſharp. Thoſe for ſaſh-lines have four grooves, and for drum-lines eight grooves.

TOPPINGS, what comes from clearing hemp when hatchelling.

TOPPING AND TAILING is the clearing both ends of the hemp with the hatchell.

TRUCK-BARROWS are of different ſizes, have three wheels, and are uſed to take hauls of yarn from the yarn-houſe, and remnants of yarn, coils of rope, &c. from the ground to the rope-houſe.

TRUSSELS have four legs braced together with ſtout pins: they are uſed at the upper-end of a rope, or put under ropes of a ſhort length, when the ſtrands cannot be put on the ſtake-heads.

WARPED INTO JUNKS is yarn warped into ſhort lengths for ſpunyarn.

WARPING is running the yarn off the winches into hauls to be tarred.

WARPING-POST, a poſt, fourteen or ſixteen inches diameter, fixed in the middle of the ground for warping the yarn into hauls.

WARPING-BLOCKS are uſed to warp the yarn into hauls for tarring. The tops and bottoms are made to ſeparate, to let in the ſheaves and ſcrew down.

WARPING-HOOK, for hanging the yarn on, when warping into hauls for tarring, is a large iron hook hung occaſionally to the warping-poſts.

WHIRLS are of beech or aſh, five inches long, cylindrically formed, and fixed on iron ſpindles in the heads of wheels, with a hook at one end for the ſpinner to hang his hemp on. They are likewiſe uſed to hang the yarn on for hardening, and laying ropes, from a ſix-thread ratline to a two and a half inch rope. Thoſe for twines and lines are made of box wood, with a hole through the middle, and two or more grooves round them, one to hold the catgut which encircles the wheel, and the other to hold a ſmall cap, made of catgut, to which the thread is faſtened in ſpinning or laying. The whirls for large work are four inches in diameter, with three or four grooves and an iron cap.

WINCH (a) is, to wind the yarn on as it is ſpun, and conſiſts of eight ſpokes, to form the body, and eight blades, four at each end, to contain the ſpokes, and an iron bolt with a round head to turn it on.

WOOLDERS, ſingle and double handed, are ſticks about three feet long and four inches in circumference, with ſtrops of rope-yarn made faſt, to fix on the rope and aſſiſt the men at the hooks in cloſing the rope.

WORMING is laying ſtrands along the cuntlines of ropes, to make an even ſurface for ſerving.

YARN, called twenty-five, twenty, and eighteen thread yarn, differs only in the fineneſs; the twenty-five being finer than the twenty, &c. It is thus diſtinguiſhed, becauſe either twenty-five, twenty, or eighteen threads a hook, make a rope of three inches in circumference, and ſo in proportion.

THE PRACTICE OF ROPE-MAKING.

TO explain what ropes are ſeems to be unneceſſary. Their utility on-board of ſhips, will be fully diſcuſſed in that part of this work which relates to the rigging. Under the preſent head, we ſhall develope the art of making the various ropes, not only thoſe uſeful in nautical concerns, but ſhall extend our directions from the cable to the ſmalleſt line.

HEMP for making cordage. RIGA RHINE HEMP is the beſt; the next in quality is PETERSBURGH BRAAK HEMP; and of theſe cordage for ſhipping is generally made: but ſome Druana, Koningsberg, and Archangel, hemp, is equal to any except the Riga rhine. Memel hemp is inferior.

Riga out-ſhot and Peterſburgh out-ſhot hemp is little inferior to the Peterſburgh braak hemp; and ropes made from them are with difficulty diſtinguiſhed from thoſe made of braak hemp.

Chucking is a long, ſtout, coarſe, hemp, rather foul, and uſed for making inferior rope. Short chucking is the foul hemp from the ends of the long chucking.

Half-clean hemp is ſhort, very foul, and full of ſhivers. Cordage made from it is conſequently foul, and eaſily diſtinguiſhed from that of the braak hemp. It is, however, fit for ſpunyarn.

Codilla is a ſhort hemp taken from the root-end of Peterſburgh.

The inferior hemps are chiefly uſed for ordinary white ropes for exportation.

Italian hemp is of a fine, white, ſoft, texture, ſix or ſeven feet long, and is chiefly uſed in England for ſeaming-twine or fine fiſhing-lines.

The bands, which the bales of hemp are bound with, are of the ſame quality with the hemp they bind, and are made into ſpunyarn; but, if very good and ſpun ſmartly, they will warp for packing-ropes and other cordage.

Ropes ſhould be made of nothing inferior to Riga or the beſt Peterſburgh hemp, well hatchelled, to clear the ends, which elſe, in ſpinning, would run in with the long hemp. One pint or more of oil, according to the quality of the hemp, ſhould be uſed to every hundred weight, to oil the ends, (which is done with a wad of hemp,) that they may paſs free in hatchelling, and from the ſides of the ſpinner when ſpinning.

After the hemp is properly cleaned by the hatchell, it is ſpun into yarn. In ſpinning, the ſpinner muſt be careful to hold his hand cloſe; otherwiſe the yarn will be neither round nor ſmooth. The ſpinning-wheel muſt be kept turning a conſtant regular pace, that the yarn may be ſpun with a regular turn or twiſt; for, if ſlack-ſpun, it will break in warping or ſtraining up.

In general, every yarn or thread for cordage ſhould be ſpun the length of one hundred and ſixty fathoms, and weigh from three and a half to four pounds; it ſhould then be wound upon winches, and warped into hauls for tarring.

The yarn for tarring has a ſlight turn put into it,* and is laid by the ſide of the tar-kettle: a piece of rope is then tied to one end of the haul, and carried under the ſtep in the tar-kettle, through the nipper and round the capſtern, which, being turned, draws the yarn through the kettle, from whence it is hauled off and placed in the yarnhouſe.

The tar muſt be well boiled before uſed, and kept gently boiling while the yarn is in the kettle. (Some think a briſk boiling makes brighter yarn.) If too hot, and the yarn not kept clear of the bottom, it will burn; if too cold, it will make it overweigh and clog. That all parts of the yarn may be equally tarred, the capſtern ſhould be kept regularly going; for if, by accident, it ſhould ſtop, the yarn would burn; to prevent which, the ſtep that keeps the yarn down muſt be inſtantly raiſed, and the yarn taken out.

Yarn for cables requires more tar than for hawſer-laid ropes. For running and ſtanding rigging, the leſs tar the better, provided the thread is well covered.

After yarn is tarred, it is laid in the yarn-houſe, for a day or two, to harden, before the hauls are opened, for making into ropes or ſtrands for cables.

The yarn, for twiſting into ſtrands, is hung on the hooks in the tackle-board, at the upper-end of the walk, and upon hooks in the breaſt-board of the ſledge, at the lower-end, which are turned by men at both ends until the ſtrands are hard: It is kept from the ground by the ſtake-heads.

Before the turn is put in, the yarn ſhould be ſtretched to its full extent by means of the tackle fixed from the ſledge to the capſtern, at twenty yards aſunder, at the lower-end of the ground; and, when ſtretched to two hundred fathoms, the preſs is put on the ſledge and drag, before the tackle-fall is caſt off; for, if the yarn be not properly ſtretched before the tackle-fall is caſt off, the rope will not be of its ſize nor well made.

When twiſted ſufficiently hard, the ſtrands are hung on one hook in the breaſt-board of the ſledge, but remain ſeparate on the three hooks at the other end. The top is placed in at the ſledge, and the rope twiſted by turning the hooks at both ends one way, and, as the rope cloſes, the top moves toward the upper end. [See top.]

The ſtrength of the men at the hooks being greatly inadequate to the force required for twiſting of cables, woolders are uſed, according to the ſize of the cable, at equal diſtances, along the whole length.

The ſtrands ſhould have a good hardening before the top is put in to lay the rope, and the layer ſhould ſee that the heavers at the upper-end keep the ſame hardneſs that the ſtrands had before the top ſet off, nor ſhould he begin to lay the rope until the ſledge or wheel is moved by the power of the twiſt from the upper-end.

When the top is put in, ſome of the weight ſhould be taken off the ſledge or drag; for, if laid with as much weight as is uſed in the hardening, it would be too ſtiff, but, by removing a part of the weight, the ſtrands will couch better.

Cables ſhould be rounded by the lower hook after they are laid, to throw the turn well up. They are generally thought to wear beſt when ſlack-laid; but ſome think when ſhort-laid.

Thirty fathoms of yarn, warped for each ſtrand, will make twenty fathoms of hawſer-laid rope; it being as three to two. [See table of yarn]

* Or is ſlightly twiſted.

Thirty fathoms of yarn, warped for each ſtrand, will make eighteen fathoms of cable-laid rope; it being as five to three.

Thirty-five fathoms of yarn, when warped and hauled about in four parts, will make a ſtay-rope of five fathoms, the ſtrands being ſhorter laid than other cable-laid ropes.

Bolt-ropes. Twenty-eight fathoms and a half of yarn make twenty fathoms of rope.

Buoy-ropes are commonly laid ſhorter than cables.

The general rule for all four-ſtrand ropes is, for every twenty fathoms to allow thirty-one, which is one fathom more than for three-ſtrand ropes.

Hawſer-laid ropes ſtand, when cloſed, one hundred and thirty-five fathoms, and cable-laid one hundred and twenty fathoms.

For hawſer-laid ropes, the bigneſs in the yarn ſhould be as 2 and $\frac{1}{4}$ is to 3; ſo that, to make a rope of 3 inches, take as many threads of yarn as meaſure 2 inches and $\frac{1}{4}$, and ſo in proportion.

It has been proved that a cable of 10 inches and a half in circumference, made from very fine ſpun yarn, is equal in ſtrength and duration to a common cable of 14 inches.

CABLETS, uſed for tow-lines or hawſers, require the ſtrands to be laid ſhorter than cable-ſtrands, but not ſo ſhort-laid in cloſing; for, being uſed in water, they would become ſtiff, hard, unhandy to coil away, and liable to break in cold weather.

Yarn, for ropes of this ſort, ſhould be finer than for cables, and ſpun to run from 18 to 20 threads to 3 inches circumference. It ſhould not be much tarred, (the yarn being preſſed in making the ſtrands, and again in cloſing,) as the tar would ooze out and the ſtrands kink.

STAY-ROPES have four ſtrands, with a heart running through the middle, which keeps the rope true; and, when hawſer-laid, as a rope, prevents it from ſtretching, and the ſtrands have each their proper bearing. The ſtays are made of fine yarn, ſpun from the beſt topt hemp. Twenty threads a-hook make a rope 3 inches in circumference, and ſo in proportion for any ſize. The yarn is warped to the length and ſize for the ſtay wanted. The ſtrands are warped long enough for one ſtrand to make two, when hauled about and hung upon the back-hook. By this an eye is left for the upper-end of the ſtay to go through and form a collar to go over the maſt-head.

For ſtays of 9 inches in circumference, each ſtrand ſhould be 3 inches and a half, and ſo in proportion. The heart muſt be near the ſize of the ſtrand, or the rope will not lie round and true.

Particular attention ſhould be paid in making the ſtays, as on them the ſafety of the maſt, &c. greatly depends.

Main, fore, and mizen, topmaſt, and ſome topgallant-maſt, ſtays are cable-laid.

TACKS, main and fore, are cable-laid, and regularly tapered from about 10 yards from the knot to the end; when finiſhed they ſhould be half the circumference at the end as at the knot; they are tapered by cutting away two threads from each ſtrand in every two yards, (or more, according to the length,) from the beginning of the taper to the end. Twelve fathoms and one foot of yarn, when warped, are allowed for each ſtrand in a tack 8 fathoms long, and ſo in proportion for any length. The ſingle foot is allowed for the knot at the head.

HEMP for BOLT-ROPE yarn and worming ſhould be well topt, and tailed; that is, both ends cleared by the hatchell, or it will not make good thread. A thread of 180 fathoms weighs 2 pounds and 15 ounces; and 28 fathoms and a half of yarn make 20 fathoms of rope, and ſo in porportion.

BOLT-ROPE is ſlack-laid, made white, and ſtoved and tarred by the ſail-maker when uſed. For the merchant-ſervice, it is generally tarred in hauls, as other rope, but ſometimes as for the navy.

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TILLER-ROPE is made of fine white 25-thread yarn, untarred, and contains 3 or 4 ſtrands, with or without a heart. It is laid harder than other ropes.

Ropes, from 2 inches to the largeſt ſize, for running rigging, are hawſer-laid, and made of 3 ſtrands on a ſledge: theſe take more hardening and cloſing than thoſe made on a wheel, and, when laid, ſtand 120 to 130 fathoms. They ſhould be ſhort-laid, a good hard kept up before, and the hook or wheel turned briſkly about behind; but it depends much on the judgement of the layer.

Ropes made of hemp inferior to Peterſburgh braak hemp, viz. half clean or out-ſhot, groundtows, and white oakum, purchaſed as old ſtores from the navy ſales, &c. are eaſily known by opening the end for two or three feet, untwiſting the ſtrands, and opening the yarn a little way; if it appears ſhort, in uſing it will ſtretch, and leſſen in the circumference.

Ropes made from topt hemp will not ſtretch ſo much as common cordage, for the ſhort hemp taken from it hinders it from receiving ſo much tar.

Deep-ſea lines are hawſer-laid; hand lead-lines, marline, houſe and ſean lines, ſean-ropes, and hammock-lines, are made from groundtows or inferior hemp dreſſed down to ſhorts, and what comes from it makes oakum.

The toppings of all hemp, for bolt-rope yarn, ſtay-yarn, &c. is made into ſpun-yarn, containing 2, 3, or 4, yarns, which is tarred more than if for cordage.

TWICE-LAID CORDAGE is made of caſt rigging, as ſhrouds, ſtays, mooring and other cables, which, if not much worn, will make good ropes for wetting ſhips ſides, worming and woolding for cables, ſpun-yarn for ſeizing, worming for large ſtays, ſeizing for ſtrops of blocks, ſmall cable-laid ropes for warping ſhips, ratlines, ſcaffolding-ropes for dock yards, &c.

When the yarn of this old ſtuff is overhauled, a little thin tar ſhould be poured on it, which will make it pliable and lie better. The yarn unfit for knotting will pick into oakum for caulking.

To open a cable, for making it into ſmall ropes, hang the ſtrands upon 3 hooks in the tackle-board, ſtretch it out tight upon the hooks in the ſledge, and heave till they are untwiſted; then draw out the yarn.

The proceſs of making ſmall ropes is ſimilar to making large ones; except the twiſting and cloſing, which are done by a back-frame wheel or a table-wheel.

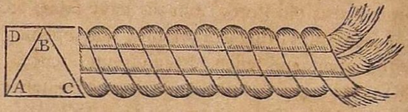
In all cable-laid ropes, the proportion of the circumference is to the length of the ſtrand in one round as 11 to 15; that is, if the circumference be 14 inches and a half, the length of the ſtrand in one circumference is 19 inches and $\frac{7}{8}$. In all hawſer-laid rope the proportion is as 12 to 16; that is, if the circumference be 7 inches, the length of the ſtrand in one circumference is near 9 inches and $\frac{3}{8}$. The ſtrength of ropes depends on the hardening or well manufacturing, and not on the bare ſtrength of the hemp; for it ſtrengthens through every ſtage. Viz. When firſt ſpun into yarn, it is little better than hemp extended; when twiſted into ſtrands, it ſhortens and ſtrengthens, and encreaſes in the ſame manner when laid into rope.

Where the diameter and circumference of one rope to another is as 2 to 1, that is, where one rope is twice as big as another, the ſquare of the diameter is as 4 to 1; which ſhews, that one rope has 4 times as much yarn in it as the other, and conſequently is 4 times as ſtrong, according to the different magnitudes. [See Table of the Proportional Strength of Ropes.]

Cable-laid ropes ſhorten as 5 to 3, and hawſer-laid ropes as 3 to 2; conſequently, the length of the yarn and ſtrength will be accordingly; that is, the ſtrength will be in the yarn, after it is laid in the rope, as much as if the rope-maker, in ſpinning, had allowed the quan-

tity of hemp in 2 feet as he did in 3 feet, ſo that the ſtrength communicated by the proceſs is two-thirds.

A rope is the ſame ſize when laid as the yarns were before twiſted; ſo that what the yarns are leſſened by twiſting is made up by ſhortening; from which it is inferred, that the yarns are always of an equal bigneſs, ſince the hemp is the ſame at one time as at another, and not any way diminiſhed. This ſtrength in ropes, cauſed by the ſhape and form, is demonſtrated by the following figure.



Here A B C ſhews the length of the ſtrand in one round. A B the angle the ſtrands make in laying; A C the progreſſive length that the ſtrands make by one circumference; and A D the diameter of the rope.

Were the ſtrands ſingle, without being twiſted one about another, the ſtrength would then be only in proportion as the area of each particular ſtrand is in itſelf; but, if the ſtrands could poſſibly be twiſted ſo as to be directly perpendicular to the baſe, the ſtrength would then be found, by multiplying the diameter of the ſtrands and the diameter of the whole rope one into the other, and the half of the product would be the ſtrength of the ſaid ſtrands; but more particularly take the area of the ſingle ſtrand and area of the whole cable, and add them together, and the half of that will ſhew the ſtrength of each ſtrand when they are well twiſted together.

But as it may be obſerved the ſtrands lie at a certain angle between a perpendicular and the baſe, ſo that, as the angle of incidence is to radius ſo is the relative to the abſolute ſtrength.

LINES, TWINE, &c.

BOLT-ROPE Twine, uſed in ſewing the ſail to the bolt-rope, is made from the bar of the long hemp, or from the long rough hemp unbeat. It contains two or three threads, is twiſted ſlack, and wound into half-pound ſkains containing 200 yards. Eight threads are ſpun out of half a pound of hemp, each 50 yards long.

Cod-lines of 18 threads are uſed on the banks of Newfoundland. The thread is ſpun 100 yards, having 6 threads to a ſtrand, 3 ſtrands to the line, and ſtanding 40 fathoms, which weigh 3 pounds.

Cod-lines of 15 threads, 5 in a ſtrand, ſmartly laid, ſpun 90 yards, ſtand 35 fathoms, which weigh 2 pounds and a half.

Cod-lines of 12 threads, 4 in a ſtrand, are ſpun 80 yards. They are ſmartly laid, and ſtand 30 fathoms, weighing 2 pounds.

Cod-lines for home uſe have 12 threads, 4 in a ſtrand. Thirty-five fathoms weigh one pound and a quarter.

Cod-lines of 9 threads, 3 in a ſtrand, ſpun 80 yards, ſtand 30 fathoms, which weigh one pound and a half.

Cork-lines for nets and ſeans, uſed in the royal navy, are made as the ſean-lines. Ten fathoms weigh 3 pounds.

Deep-ſea lines, 18 threads, cable-laid, are made of good bar hemp, 2 threads twiſted together, 3 to a ſtrand. The ſtrands before laid to ſtand 160 fathoms, and to be ſmartly laid. They will ſhorten in laying and cloſing to 120 fathoms, and weigh 12 pounds a line.

Deep-ſea lines, for the royal navy, are of 12 threads, hawſer-laid. Eighty-five fathoms weigh 14 pounds.

Deep-ſea lines of 12 threads, hawſer-laid, are generally for exportation. They have 3 ſtrands, 4 threads in a ſtrand, ſpun 160 yards, and ſtand 60 fathoms, which weigh 12 pounds.

Deep-ſea lines, uſed by Eaſt-Indiamen, are of ſtrong rough hemp, cable-laid, 9 threads, 3 in a ſtrand, ſpun 120 yards, ſtand 50 fathoms, and weigh 8 pounds.

Dolphin-lines of 12 threads, 4 in a ſtrand, each ſpun 120 yards, ſtand 50 fathoms, which weigh 2 pounds and a half.

Drum-lines, for drums, have 16 threads, 2 in a ſtrand; they are laid with a heart, ſpun 60 yards, and ſtand 20 fathoms, which weigh 2 pounds and a half.

Drum-fiſh-line has 9 threads, 3 in a ſtrand, is ſpun 65 yards, ſtands 25 fathoms, which weigh one pound.

Foregaugers. Yarn for foregaugers is made of the beſt dreſſed long hemp, each thread of 80 fathoms long, weighing half a pound. It has 3 ſtrands, 48 threads in each, and is warped to the number of foregaugers wanted.

Hambro'-lines are chiefly uſed by ſail-makers for reef-holes. The 12-thread lines have 4 threads in a ſtrand, ſpun 70 yards, and ſtand 25 fathoms, which weigh 4 pounds.

Hambro' 9-thread lines, 3 threads in a ſtrand, are ſpun 70 yards, and ſtand 25 fathoms, which weigh 3 pounds.

Hambro' 6-thread lines have 3 ſtrands, 2 threads in a ſtrand, ſpun 60 yards, ſtand 20 fathoms, which weigh 2 pounds.

Hammock-lines of 3 threads, ſpun 100 yards, are ſlack-laid, ſtand 50 fathoms, and weigh 3 pounds.

Hand-lead-lines have 12 threads, 4 in a ſtrand, ſpun 60 yards, ſmart-laid, ſtand 20 fathoms, which weigh 4 pounds.

Houſe-line, of 3 threads laid together, uſed for ſeizing ſtrops of blocks, is ſpun 60 yards, and ſtands 30 fathoms, which weigh one pound.

Jack-line is made of bar hemp, and has 9 threads, 3 in a ſtrand; it is made to any given length.

Lead-rope, for nets and ſeans, is made as the ſean-lines. Ten fathoms weigh 4 pounds.

Log-lines of 12 threads are made from fine long hemp, 4 threads twiſted together. The ſtrands are ſmartly laid, and 30 fathoms weigh one pound.

Log-lines of 9 threads are made from ſound long hemp, three threads twiſted together, ſpun 80 yards, ſmartly laid, and, when ſtretched 30 fathoms, weigh one pound.

Log-lines of 6 threads are made from the bar of the long hemp that was dreſſed for fine twine, &c. and ſpun 80 yards in length. Two threads are twiſted together, and the ſtrands ſmartly laid: when ſtretched, it is 30 fathoms, and weighs one pound.

Mackrel-line; 6 threads, 2 in a ſtrand, ſpun 65 yards, ſtands 25 fathoms, which weigh half a pound.

Marline, of 2 threads laid together, is generally uſed for ſeizing ſtrops of blocks; it is ſpun 90 yards, and ſtands 40 fathoms, which weigh one pound.

Saſh-line of 4 ſtrands, 2 threads in a ſtrand, is ſpun 60 yards, and weighs 2 pounds a line.

Seal-twine for ſeal-nets is made of 12 threads, 2 threads firſt twiſted together, then 6 of them hardened together, and wound up in half pound ſkains, or 80 yards.

Seaming or ſail-makers twine, for ſewing the ſeams of ſails, is made of the beſt long hemp, beaten, ſpun fine, and well dreſſed over a fine clearer; 18 threads are ſpun out of half a pound of hemp, every thread 50 yards in length; 2 threads are twiſted together ſlack and wound on a reel, in half pound ſkains, containing 450 yards: but 3 threads are uſed in the royal navy.

Sean-lines, for fixing the ſean-nets, have 18 threads, 6 in a ſtrand. They are laid ſlack, and are from 30 to 100 fathoms long. Ten fathoms weigh 2 pounds.

Sean-twine is made from good long hemp, each thread ſpun 54 yards; 3 threads are laid together. When hardened and ſtretched, each cord ſtands 50 yards; 900 yards are wound on a reel, and 18 cords weigh 2 pounds.

Sean-nets are made of 3-ſtrand topt-twine to any given length or depth. The meſhes or ſquares are from 2 inches in the bunt regular to 3 inches in the wings.

Seans uſed in the royal navy are made of 2-ſtrand twine, 2 pounds and $\frac{1}{4}$ to a ran, and 18 cords to a ran; 2 threads to a cord, or 900 yards of twine to 2 pounds and $\frac{1}{4}$.

Spunyarn, for ordinary white ropes, is made of bands, which ſhould be twice hatchelled through a hatchell with finer teeth than thoſe uſed to hemp for cordage. A thread of 180 fathoms in length ſhould weigh 5 pounds, and be wound upon winches in 2, 3, or 4, threads, then warped into junks to make 2, 3, or 4, yarn ſpunyarn, and wound on a reel into coils of various ſizes.

Spunyarn ſhould be well tarred, as it is uſed for ſerving round the ſhrouds and ſtays, to reſiſt the wet and keep the rope from being chafed.

Store-twine, uſed by ſail-makers for old work and on-board of ſhips, is made from good long hemp, well dreſſed. Fourteen threads are ſpun from half a pound; 2 threads are twiſted together, and wound into half pound ſkains of 350 yards.

Turtle-twine, for turtle-nets, is made of good bar hemp, ſpun 100 yards. Three threads are laid together, ſtand 90 yards, and weigh one pound.

Whale-lines are made of dreſſed hemp ſpun fine. Each thread of 160 fathoms ſhould weigh 2 pounds. Theſe lines were formerly made white, ſtoved, and then tarred, as bolt-ropes; but they are now warped and tarred as other cordage: warped 90 fathoms, which, when tarred and hauled about, make 180 fathoms, and the line to ſtand 120 fathoms, 2 inches and $\frac{1}{4}$ circumference, 3 ſtrands, 24 threads in each, and weigh about one hundred weight.

Whipping-twine. The ſame as bolt-rope twine.

Whiting-lines, of 6 threads, 2 in a ſtrand, are ſpun 60 yards, and ſtand 20 fathoms, which weigh half a pound.

Worming is made of 2 or 3 ſtrands. Two or more threads in a ſtrand are warped into ſhort hauls, and ſo knitted as to lay 2 threads together. It is tarred as other yarn for cordage. If it be made of 2 ſtrands, it is laid with a ſtick, if of 3, with a top. It is uſed for ſeizing of ropes, and for worming the cuntlines of the ſhrouds and other ſtanding rigging.

A Table ſhewing the Length of Yarn required for Cables, Hawſers, &c.

☞ For Stays, Tacks, Sheets, and Buoy-Ropes, which are Cable-laid, allow the ſame Length as is ſhewn for Yarn in the Tables for Cables, which ſhew how many Fathoms and Feet of Yarn will make a Fathom of Cable, from 1 to 120 Fathoms. — When you have the Sledge to the End of the Yarn, ſtretch it as tight as you can, and then lay as much Weight upon the Sledge as is convenient to keep the Work tight.

The Length of Yarn required for Cables, from 1 to 120 Fathoms.

Cab.	Yarn.		Cab.	Yarn.		Cab.	Yarn.		Cab.	Yarn.		Cab.	Yarn.	
Fath.	Fm.	Ft.	Fath.	Fm.	Ft.	Fath.	Fm.	Ft.	Fath.	Fm.	Ft.	Fath.	Fm.	Ft.
1	1	4	25	41	4	49	81	4	73	121	4	97	161	4
2	3	2	26	43	2	50	83	2	74	123	2	98	163	2
3	5	0	27	45	0	51	85	0	75	125	0	99	165	0
4	6	4	28	46	4	52	86	4	76	126	4	100	166	4
5	8	2	29	48	2	53	88	2	77	128	2	101	168	2
6	10	0	30	50	0	54	90	0	78	130	0	102	170	0
7	11	4	31	51	4	55	91	4	79	131	4	103	171	4
8	13	2	32	53	2	56	93	2	80	133	2	104	173	2
9	15	0	33	55	0	57	95	0	81	135	0	105	175	0
10	16	4	34	56	4	58	96	4	82	136	4	106	176	4
11	18	2	35	58	2	59	98	2	83	138	2	107	178	2
12	20	0	36	60	0	60	100	0	84	140	0	108	180	0
13	21	4	37	61	4	61	101	4	85	141	4	109	181	4
14	23	2	38	63	2	62	103	2	86	143	2	110	183	2
15	25	0	39	65	0	63	105	0	87	145	0	111	185	0
16	26	4	40	66	4	64	106	4	88	146	4	112	186	4
17	28	2	41	68	2	65	108	2	89	148	2	113	188	2
18	30	0	42	70	0	66	110	0	90	150	0	114	190	0
19	31	4	43	71	4	67	111	4	91	151	4	115	191	4
20	33	2	44	73	2	68	113	2	92	153	2	116	193	2
21	35	0	45	75	0	69	115	0	93	155	0	117	195	0
22	36	4	46	76	4	70	116	4	94	156	4	118	196	4
23	38	2	47	78	2	71	118	2	95	158	2	119	198	2
24	40	0	48	80	0	72	120	0	96	160	0	120	200	0

The Length of Yarn to Hawſer-laid Cordage, from 1 to 140 Fath.

Rope	Yarn.		Rope	Yarn.		Rope	Yarn.		Rope	Yarn.		Rope	Yarn.	
Fath.	Fm.	Ft.	Fath.	Fm.	Ft.	Fath.	Fm.	Ft.	Fath.	Fm.	Ft.	Fath.	Fm.	Ft.
1	1	3	29	43	3	57	85	3	85	127	3	113	169	3
2	3	0	30	45	0	58	87	0	86	129	0	114	171	0
3	4	3	31	46	3	59	88	3	87	130	3	115	172	3
4	6	0	32	48	0	60	90	0	88	132	0	116	174	0
5	7	3	33	49	3	61	91	3	89	133	3	117	175	3
6	9	0	34	51	0	62	93	0	90	135	0	118	177	0
7	10	3	35	52	3	63	94	3	91	136	3	119	178	3
8	12	0	36	54	0	64	96	0	92	138	0	120	180	0
9	13	3	37	55	3	65	97	3	93	139	3	121	181	3
10	15	0	38	57	0	66	99	0	94	141	0	122	183	0
11	16	3	39	58	3	67	100	3	95	142	3	123	184	3
12	18	0	40	60	0	68	102	0	96	144	0	124	186	0
13	19	3	41	61	3	69	103	3	97	145	3	125	187	3
14	21	0	42	63	0	70	105	0	98	147	0	126	189	0
15	22	3	43	64	3	71	106	3	99	148	3	127	190	3
16	24	0	44	66	0	72	108	0	100	150	0	128	192	0
17	25	3	45	67	3	73	109	3	101	151	3	129	193	3
18	27	0	46	69	0	74	111	0	102	153	0	130	195	0
19	28	3	47	70	3	75	112	3	103	154	3	131	196	3
20	30	0	48	72	0	76	114	0	104	156	0	132	198	0
21	31	3	49	73	3	77	115	3	105	157	3	133	199	3
22	33	0	50	75	0	78	117	0	106	159	0	134	201	0
23	34	3	51	76	3	79	118	3	107	160	3	135	202	3
24	36	0	52	78	0	80	120	0	108	162	0	136	204	0
25	37	3	53	79	3	81	121	3	109	163	3	137	205	3
26	39	0	54	81	0	82	123	0	110	165	0	138	207	0
27	40	3	55	82	3	83	124	3	111	166	3	139	208	3
28	42	0	56	84	0	84	126	0	112	168	0	140	210	0

Bolt-Rope.

The Length of Yarn for making Bolt-Ropes is as 7 to 10, that is, 21 Fath. of Rope will take 30 Fath. of Yarn.

Rope	Yarn.		Rope	Yarn.		Rope	Yarn.	
Fath.	Fm.	Ft.	Fa	Fm.	Ft.	Fa	Fm.	Ft.
5	7	1	27	38	3	49	69	4½
6	8	3	28	40	0	50	71	3
7	10	0	29	41	3	51	72	4½
8	11	3	30	42	4½	52	74	1½
9	12	5	31	44	1	53	75	3
10	14	1½	32	45	4½	54	77	0
11	15	4½	33	47	0	55	78	3
12	17	0	34	48	3	56	80	0
13	18	3	35	50	0	57	81	1½
14	20	0	36	51	1½	58	82	4½
15	21	3	37	52	4½	59	84	1½
16	22	5	38	54	0	60	85	3
17	24	1½	39	55	3	61	87	0
18	25	4½	40	57	0	62	88	3
19	27	0	41	58	1½	63	90	0
20	28	3	42	60	0	64	91	1½
21	30	0	43	61	1½	65	93	0
22	31	3	44	62	4½	66	94	1½
23	32	5	45	64	0	67	95	3
24	34	1½	46	66	3	68	96	4½
25	35	3	47	67	0	69	98	1½
26	37	0	48	68	1½	70	100	0

The Length of Yarn for a Strand of a Buoy-Rope, or a Sheet, to bring about in 3 Parts.

Fm. of Str.	Yarn	Fm. of Str.	Yarn
	Fath.		Fath.
1	5	21	105
2	10	22	110
3	15	23	115
4	20	24	120
5	25	25	125
6	30	26	130
7	35	27	135
8	40	28	140
9	45	29	145
10	50	30	150
11	55	31	155
12	60	32	160
13	65	33	165
14	70	34	170
15	75	35	175
16	80	36	180
17	85	37	185
18	90	38	190
19	95	39	195
20	100	40	200

Stays.

The Len. of Y. for mak. Stays is as 7 to 1, that is, 3 Fa. of Ro. will take 21 F. of Yarn.

Stay.	Yarn.
Fath.	Fath.
1	7
2	14
3	21
4	28
5	35
6	42
7	49
8	56
9	63
10	70
11	77
12	84
13	91
14	98
15	105
16	112
17	119
18	126
19	133
20	140

The proportional Strength Ropes bear to each other.

Circum in Inch.	Diam. in Inch.	Area in Inches.	Squ. of the Dia. in Inc.	Circum in Inch.	Diam. in Inch.	Area in Inches.	Squ. of the Dia. in Inc.
1	0 $\frac{32}{100}$	0 $\frac{17}{1000}$	0 $\frac{102}{1000}$	12	3 $\frac{17}{20}$	11 $\frac{6}{10}$	14 $\frac{8}{10}$
1½	0 $\frac{47}{100}$	0 $\frac{80}{1000}$	0 $\frac{22}{100}$	12½	3 $\frac{32}{40}$	12 $\frac{4}{10}$	15 $\frac{9}{10}$
2	0 $\frac{64}{100}$	0 $\frac{32}{100}$	0 $\frac{41}{100}$	13	4 $\frac{3}{10}$	13 $\frac{1}{2}$	17 $\frac{3}{10}$
2½	0 $\frac{80}{100}$	0 $\frac{50}{100}$	0 $\frac{64}{100}$	13½	4 $\frac{2}{10}$	14 $\frac{5}{10}$	18 $\frac{6}{10}$
3	0 $\frac{95}{100}$	0 $\frac{71}{100}$	0 $\frac{99}{100}$	14	4 $\frac{9}{10}$	15 $\frac{6}{10}$	19 $\frac{8}{10}$
3½	0 $\frac{12}{100}$	0 $\frac{98}{100}$	1 $\frac{27}{100}$	14½	4 $\frac{6}{10}$	16 $\frac{7}{10}$	21 0
4	1 $\frac{23}{100}$	1 $\frac{28}{100}$	1 $\frac{64}{100}$	15	4 $\frac{3}{4}$	17 $\frac{8}{10}$	22 $\frac{1}{2}$
4½	1 $\frac{44}{100}$	1 $\frac{7}{10}$	2 $\frac{3}{40}$	15½	4 $\frac{19}{20}$	19 $\frac{2}{10}$	24 $\frac{1}{2}$
5	1 $\frac{6}{10}$	2 0	2 $\frac{11}{20}$	16	5 $\frac{1}{10}$	20 $\frac{1}{2}$	26 0
5½	1 $\frac{3}{4}$	2 $\frac{4}{10}$	3 $\frac{1}{20}$	16½	5 $\frac{1}{4}$	21 $\frac{3}{4}$	27 $\frac{1}{2}$
6	1 $\frac{92}{100}$	2 $\frac{9}{10}$	3 $\frac{3}{10}$	17	5 $\frac{4}{10}$	23 0	29 0
6½	2 $\frac{3}{40}$	3 $\frac{13}{20}$	4 $\frac{3}{10}$	17½	5 $\frac{6}{10}$	24 $\frac{1}{2}$	31 $\frac{1}{4}$
7	2 $\frac{9}{40}$	3 $\frac{19}{20}$	4 $\frac{9}{10}$	18	5 $\frac{3}{4}$	25 $\frac{3}{4}$	33 0
7½	2 $\frac{4}{10}$	4 $\frac{1}{2}$	5 $\frac{3}{4}$	18½	5 $\frac{9}{10}$	27 $\frac{1}{4}$	35 0
8	2 $\frac{11}{20}$	5 $\frac{1}{10}$	6 $\frac{1}{2}$	19	6 $\frac{1}{10}$	29 0	36 $\frac{1}{2}$
8½	2 $\frac{7}{10}$	5 $\frac{8}{10}$	7 $\frac{3}{10}$	19½	6 $\frac{1}{4}$	30 $\frac{3}{4}$	39 0
9	2 $\frac{35}{40}$	6 $\frac{6}{10}$	8 $\frac{3}{10}$	20	6 $\frac{4}{10}$	32 $\frac{1}{4}$	41 0
9½	3 $\frac{1}{40}$	7 $\frac{2}{10}$	9 $\frac{2}{10}$	20½	6 $\frac{11}{20}$	33 $\frac{3}{4}$	43 0
10	3 $\frac{7}{40}$	8 0	10 $\frac{1}{10}$	21	6 $\frac{7}{10}$	35 0	45 0
10½	3 $\frac{7}{20}$	8 $\frac{8}{10}$	11 $\frac{[illegible]}{10}$	21½	6 $\frac{9}{10}$	37 0	47 $\frac{1}{2}$
11	3 $\frac{1}{2}$	9 $\frac{6}{10}$	12 $\frac{2}{10}$	22	7 0	38 $\frac{1}{2}$	49 0
11½	3 $\frac{13}{20}$	10 $\frac{7}{10}$	13 $\frac{3}{10}$				

CABLES AND CORDAGE FOR THE ROYAL NAVY.

GOVERNMENT are frequently ſupplied with cables and other cordage from the merchants yards; in which caſe, they find their own hemp; and ſtipulate that they ſhall be made in the following mode, and with the following proportions of materials.

A proper quantity of the beſt Peterſburgh braak hemp, for the cables, &c. wanted, is furniſhed and delivered by government to the maker: each cable to be 100 fathoms long; cablets 120 fathoms; hawſers, down to 7 inches incluſive, 108 fathoms; hawſers, 6 inches and a half and under, 130 fathoms; and coils 130 fathoms in length: to be made of the hemp ſent by government; which is to be dreſſed, ſpun, tarred, and laid, under the inſpection of a perſon appointed.

All cables and cordage to be tarred with good Stockholm tar, without mixture of any other, except about one-third part, which may be of Ruſſia tar; and to be made of the ſame ſized yarn, and with the ſame number of threads tarred as dry; laid with as good a preſs, and hardened in the ſame manner, as in his majeſty's yards; and to be in every reſpect as good as any made by his majeſty's workmen.

A white thread, twiſted the contrary way, is to be laid in all the ſtrands of the cables and large cordage; and a twine in the ſmall cordage for the king's mark, ſo as to be ſeen on the outſide of the ſtrands.

In any of the ſtrands, there is to be no greater number of threads at the ends of the cables or cordage than in the middle of them.

The tar is to be ſurveyed and approved of, by the perſon appointed to overſee the making, before it is uſed.

An oath is to be taken, by the maſter or foreman, that the cables, &c. delivered were made of his majeſty's hemp, and tarred as aforeſaid, and the affidavit is to be produced at the place where the cordage is delivered.

With each parcel of cordage, a bill of parcels muſt be delivered, containing every particular; with the ſize, length, and weight, thereof: with a certificate from the overſeer, that the particulars are made in all reſpects agreeably thereto, as to workmanſhip, ſize, and quality of tar. To each cable, &c. is to be faſtened a tally, with the maker's name, and weight and length of ſuch cable, &c.

The work to be delivered at the place agreed on, free of expence to government.

The cordage is to be meaſured in the maker's ground; and, ſhould it exceed the following ſizes, it is not to be received:

Cables of 10 inches and upwards, $\frac{3}{4}$ of an inch.

Cables of 9 inches and a half to 4 inches, $\frac{1}{2}$ an inch.

Hawſers of 12 inches to 7 inches and a half, $\frac{3}{4}$ of an inch.

Hawſers of 7 inches to 4 inches, $\frac{1}{2}$ an inch.

The Weight of Cables, Hawfers, &c. for Government.

Inch. in circum.	Cables of 100 Fathoms.	cwt.	q.	lb.
14	To weigh	41	2	20
13½	. . . . .	38	3	1
13	. . . . .	35	3	9
12½	. . . . .	32	3	17
12	. . . . .	30	1	10
11½	. . . . .	27	3	4
11	. . . . .	25	5	10
10½	. . . . .	23	1	17
10	. . . . .	21	0	23
	Cablets of 120 Fathoms.			
9½	To weigh.	22	2	9
9	. . . . .	20	1	17
8½	. . . . .	18	0	27
8	. . . . .	16	0	6
7½	. . . . .	13	3	16
7	. . . . .	12	0	18
6½	. . . . .	10	1	19
6	. . . . .	9	0	12
5½	. . . . .	7	3	7
5	. . . . .	6	2	1
4½	. . . . .	5	0	23
4	. . . . .	4	0	18
3½	. . . . .	3	1	22
3	. . . . .	2	2	11
2½	. . . . .	1	3	0
2	. . . . .	1	1	4

Inch. in circum.	Hawfers of 130 Fathoms.	cwt.	q.	lb.
6½	To weigh	13	1	11
6	. . . . .	11	1	3
5½	. . . . .	9	2	2
5	. . . . .	7	3	19
4½	. . . . .	6	1	22
4	. . . . .	5	0	14
	Coils of 130 Fathoms.			
3½	To weigh	3	3	7
3	. . . . .	2	3	20
2½	. . . . .	2	0	5
2	. . . . .	1	1	6
1½	. . . . .	0	3	13
1	. . . . .	0	1	20
¾	. . . . .	0	1	4

*** The above Weights are exclufive of the Bands.

Cables, Cablets, &c. ought to agree, in weight and meafurement, with the foregoing table; but muft not exceed in weight more than ten hundred weight in twenty tons, or in that proportion, although their actual meafurements may happen to be encreafed, as before mentioned.

If the weight of the cables and cordage exceed the weight fpecified, no allowance for making the fame, or weight of hemp, to be allowed. Three pounds weight of bands is allowed to every hundred weight of cordage.

Three quarters of a hundred of fpunyarn to be received for every ton of cordage.

Should the articles be found not conformable to thefe particulars, by his majefty's officers, they are to be taken away at the maker's expence, who is to deliver the like quantity in lieu thereof, made of his own hemp, equal in goodnefs to his majefty's.

To be paid as per agreement at the rate of   per ton.

The price paid by government, in 1792, was 4l. 10s. per ton.

CONTRACT FOR CORDAGE WITH THE EAST-INDIA COMPANY, 1792.

THE cordage is to be made of the beſt Peterſburgh braak hemp, without any hemp-bands; the hemp to be viewed before ſpun, and the yarn before tarred; each yarn muſt bear the weight of three quarters of a hundred ſuſpended, or the cordage will be refuſed. To be tarred dry with Stockholm tar, and the cordage laid hard. The ropes muſt not exceed the ſize, nor contain a leſs number of threads, than expreſſed in the annexed Table, which is, for cable-laid, 18 threads, and for hawſer-laid 21; with a white thread put in each coil, and delivered to the company's craft, free of charge, and bound up with new twelve-thread ratline. The company to receive the bounty, and payment to be made four months after delivery.

THE duty on cordage, imported, tarred or untarred, is 8s. 6d. per cwt. and no drawback. Bounty on the exportation of cordage, manufactured in Great Britain, not leſs than 3 tons, 2s. 4d.¾ per cwt. Old ropes may be imported duty free.

TABLE OF CORDAGE FOR THE EAST-INDIA COMPANY.

CABLE-LAID CORDAGE of 18 Thread Yarn, 120 to 123 Fathoms long.

Circumference	Weight.			Thrds.	Circumference	Weight.			Thrds.
Inches	Cwt.	q.	lb.	pr hook	Inches	Cwt.	q.	lb.	pr hook
2½	2	0	7	3	12½	39	0	7	80
3	2	1	0	5	13	42	1	0	85
3½	3	0	7	6	13½	45	2	7	
4	4	0	0	8	14	49	0	0	99
4½	5	0	7	10	14½	52	2	7	
5	6	1	0	12	15	56	1	0	112
5½	7	2	7	15	15½	60	0	7	
6	9	0	0	18	16	64	0	0	129
6½	10	2	7	21	16½	68	1	7	
7	12	1	0	24	17	72	1	0	144
7½	14	0	7	28	17½	76	2	7	
8	16	0	0	32	18	81	0	0	160
8½	18	0	7	36	18½	85	0	7	171
9	20	1	0	40	19	90	1	0	180
9½	22	2	7	45	19½	95	0	7	
10	25	0	0	50	20	100	0	0	200
10½	27	2	7	55	20½	105	0	7	
11	30	1	0	60	21	110	1	0	220
11½	33	0	7	66	21½	115	2	7	
12	36	0	0	72	22	121	0	0	242

SHROUD-LAID CORDAGE of 21 Thread Yarn, 130 or 133 Fathoms long.

Circumference	Weight.			Thrds.	Circumference	Weight.			Thrds.
Inches	Cwt.	q.	lb.	pr hook	Inches.	Cwt.	q.	lb.	pr hook
½	0	1	9	—	8½	21	1	15	168
¾	0	2	0	—	9	24	0	0	188
1	0	2	18	—	9½	26	3	0	210
1¼	0	3	10	—	10	29	2	0	233
1½	1	0	0	—					
1¾	1	0	18	—					
2	1	1	9	9					
2¼	1	2	0	12					
2½	1	3	11	14					
3	2	2	17	21					
3½	3	2	14	28					
4	4	2	12	37					
4½	6	0	0	47					
5	7	1	15	58					
5½	8	2	22	70					
6	10	2	18	84					
6½	12	2	0	99					
7	14	2	0	114					
7½	16	2	18	132					
8	18	3	21	149					

RATLINE.

	q.	lb.
12 Thread	3	0
9 do.	2	8
6 do.	1	14

ABSTRACT OF THE ACTS OF PARLIAMENT RELATIVE TO THE MANUFACTORY OF, AND ALLOWING A BOUNTY ON, CORDAGE, &c.

THE only parliamentary regulations, relative to the manufactory of cordage, are contained in the following abstract of "An act for more effectually preventing deceits in the manufacturing of cordage for shipping, and to prevent the illicit importation of foreign-made cordage." 25 Geo. 3. c. 56.

1. The first section of this act repeals the act of the 35. Eliz. c. 8.

2. From the 25th of July, 1785, no person shall use, in the manufacturing of cables, hawsers, or other ropes, for the use of shipping, or shall knowingly vend or sell any thereof, in the manufacturing of which there shall be used any hemp, usually known or distinguished by the respective names or descriptions of short chucking, half clean, whale-line, or other toppings, codilla, damaged hemp bought at public or other sales, or any hemp whatsoever, from which the staple part thereof shall have been taken away by the manufacturer, under the following penalties; viz. every such person, being the manufacturer of such cable, hawser, or other rope, shall forfeit such cable, hawser, or other rope, and also a sum of money equal to treble the value thereof; and every person who shall knowingly vend or sell such cable, hawser, or rope, not being the manufacturer thereof, shall forfeit a sum of money equal to treble the value.

3. And, for the better distinguishing the quality of cables, hawsers, and other ropes for the use of shipping, it is enacted, that, whenever any cable, hawser, or rope, as aforesaid, shall be manufactured of any hemp, the use whereof is not prohibited by this act, and the staple and quality whereof shall be inferior to clean Petersburgh hemp, such cable, hawser, or rope, as aforesaid, shall be deemed inferior cordage, and the manufacturer shall distinguish such cable, hawser, or rope, by running into the same, from end to end of each cable, three tarred mark-yarns, spun with the turn contrary to that of rope-yarn, and also one like tarred yarn in every other rope, for the use of shipping, and by marking or writing on the tally thereof the word STAPLE or INFERIOR, as the case shall be; and every manufacturer making default herein shall forfeit the sum of ten shillings for every hundred weight of such cable, hawser, or rope.

4. Whenever any new cable, hawser, or other rope for the use of shipping, shall be vended or sold by the manufacturer, there shall be affixed thereon a tally, containing his name, signed by himself or his attorney, together with the name of the place where the same was manufactured, under the penalty of forfeiting, for every such offence, the sum of ten shillings for every hundred weight.

5. If any rope-maker shall put his name, or permit it to be put, on the tally of any cable, hawser, or other rope for the use of shipping, not being his manufacturing; or if the vender or proprietor of any cable, hawser, or other rope as aforesaid, or any other person whomsoever, shall wilfully and knowingly put or mark, upon the tally to be affixed thereon, the name of any person, not being the manufacturer thereof, every person so offending shall forfeit, for every such offence, the sum of twenty pounds.

6. If any perſon ſhall make, or cauſe to be made, cables of old or worn ſtuff, which ſhall contain above ſeven inches in compaſs, then every perſon ſo offending ſhall forfeit and loſe four times the value of every ſuch cable.

7. All pecuniary penalties or forfeitures, by this act impoſed, exceeding five pounds, ſhall and may be recovered by action, bill, plaint, or information, in any of his majeſty's courts of record at Weſtminſter; and all pecuniary penalties or forfeitures, not exceeding five pounds, ſhall be levied and recovered by diſtreſs, and ſale of the goods and chattels of the offender, by warrant under the hand and ſeal of any juſtice of the peace for the place wherein ſuch offender ſhall reſide, which warrant every ſuch juſtice is hereby impowered to grant, upon the information or teſtimony of two or more credible witneſſes upon oath; and the overplus (if any) of the money ariſing by ſuch diſtreſs and ſale, ſhall be rendered upon demand to the owner of ſuch goods and chattels, after deducting thereout the charges and expences of ſuch diſtreſs and ſale; and in caſe ſufficient goods and chattels cannot be found, and ſuch penalty or forfeiture ſhall not be forthwith paid, ſuch juſtice ſhall cauſe ſuch offender to be committed to gaol or to the houſe of correction, there to remain for any time not exceeding three calendar months, nor leſs than ſeven days, or until ſuch penalty or forfeiture, and all coſts and charges attending the ſame, be paid; and all ſuch penalties and forfeitures, and alſo all cordage which ſhall be forfeited, in purſuance of this act, ſhall be paid and delivered to the perſon who ſhall ſue and proſecute for the ſame; and it ſhall be lawful for ſuch perſon to ſell or otherwiſe diſpoſe of ſuch cordage (after being cut into lengths not exceeding twelve feet) to and for his own uſe and benefit.

8. Whenever any ſhip or veſſel, belonging to his majeſty's ſubjects, reſident in Great-Britain, or any of the Britiſh colonies, having on board any foreign-made cordage, ſhall be navigated into any port within this kingdom, the maſter thereof, at the time of making his report at the Cuſtom-houſe, ſhall make an entry, upon oath, of all the foreign-made cordage on-board, for or in reſpect of which the ſaid duties ſhall not have been before paid (ſtanding and running rigging in uſe excepted); and ſuch maſter ſhall, before ſuch ſhip or veſſel ſhall be cleared by the officers of the cuſtoms inwards, where any diſcharge ſhall be made of her lading, pay the like duties, for all ſuch foreign-made cordage as ſhall be ſpecified or mentioned in the ſaid entry, as by law are charged upon or payable for or in reſpect of any foreign-made cordage imported into this kingdom; and if the maſter of any ſuch ſhip or veſſel ſhall make default therein, all ſuch foreign-made cordage as aforeſaid, as ſhall be on-board ſuch ſhip or veſſel, ſhall be forfeited to his majeſty; and ſuch maſter ſhall, for every ſuch offence, alſo forfeit the ſum of twenty ſhillings for every hundred weight thereof.

9. Provided always, that nothing herein before contained ſhall be deemed, conſtrued, or taken, to charge any captain or maſter, of any ſhip or veſſel coming from the Eaſt-Indies, with any duty, for or upon account of ſuch ſhip or veſſel having any foreign-made cordage on-board, ſuch cordage having been, by ſuch captain or maſter, actually brought from the Eaſt-Indies.

10. Provided alſo, that nothing in this act contained ſhall extend to the materials at preſent in the uſe of any ſhips or veſſels that were built abroad before the paſſing of this act, and are the property of the ſubjects of Great Britain.

11. If any perſon ſhall think himſelf aggrieved by any matter or thing done in purſuance of this act, and for which no particular method of relief is herein before appointed, ſuch perſon may, within fourteen calendar months, appeal to the general quarter-ſeſſions, to be holden for the place wherein the cauſe of appeal ſhall have ariſen, the appellant firſt giving fourteen days notice at leaſt in writing of his intention to exhibit ſuch appeal, and thematter thereof, to the perſon appealed againſt, and,

within four days after giving ſuch notice, entering into a recognizance, before ſome juſtice of the peace for ſuch place, with two ſufficient ſureties, conditioned to try ſuch appeal at, and abide by the order of, and pay ſuch coſts as ſhall be awarded by, the juſtices at ſuch general quarter-ſeſſions; and the ſaid juſtices, at ſuch ſeſſions, upon due proof of ſuch notice being given, and of the entering into ſuch recognizance as aforeſaid, ſhall hear and finally determine the cauſes and matters of ſuch appeal in a ſummary way, and award ſuch coſts to the party appealing or appealed againſt as they ſhall think proper; and the determination of ſuch juſtices ſhall be binding, final, and concluſive, to all intents and purpoſes whatſoever.

12. Provided always, that no order, verdict, judgement or other proceeding, made, touching or concerning any of the matters aforeſaid, or touching the conviction of any offender againſt this act, ſhall be quaſhed for want of form, or be removed by *certiorari*, or any other writ or proceſs whatſoever, into any of his majeſty's courts of record at Weſtminſter: and, where any diſtreſs ſhall be made for any ſum or ſums of money, to be levied by virtue of this act, the diſtreſs itſelf ſhall not be deemed unlawful, nor the party making the ſame be deemed a treſpaſſer, on account of any defect or want of form in the ſummons, conviction, warrant of diſtreſs, or other proceeding relating thereto; nor ſhall the party diſtraining be deemed a treſpaſſer *ab initio*, on account of any irregularity which ſhall hereafter be done by the party or parties diſtraining; but the perſon aggrieved by ſuch irregularity ſhall and may recover full ſatisfaction for the ſpecial damage in any action upon the caſe; provided that no plaintiff ſhall recover, in any action, for ſuch irregularity, if ſufficient tender of amends hath been made to him, by or on behalf of the defendant, before ſuch action brought.

13. Actions or ſuits ſhall be commenced within three calendar months next after the cauſe of action ſhall have ariſen, and not afterwards.

ABSTRACT OF AN ACT FOR ALLOWING A BOUNTY ON THE EXPORTATION OF BRITISH-MADE CORDAGE; AND FOR DISCONTINUING THE DRAWBACKS UPON FOREIGN ROUGH HEMP EXPORTED. 6 GEO. 3. C. 45.

THERE ſhall be paid for every hundred weight, containing one hundred and twelve pounds avoirdupois, of cordage, wrought up and manufactured in Great-Britain from foreign rough hemp, or hemp of the growth of Great Britain, except hemp of the growth or produce of the Britiſh colonies or plantations in America, which ſhall be really and truly exported out of this kingdom to parts beyond the ſeas (except the Iſle of Man) by way of merchandize, and ſo in proportion for any quantity of thereof, by way of bounty, the ſum of two ſhillings and four pence three farthings; which bounty ſhall be paid to the perſon exporting the ſame, by the cuſtomer or collector of the cuſtoms, with the privity of the comptroller of the port from whence the ſame ſhall be exported, on a debenture to be made forth by the ſaid cuſtomer or collector, according to the entry of the goods and the ſhipping thereof, verified by the ſearcher: and oath is to be made, by the exporter or manufacturer thereof, on the entry or debenture before the cuſtomer, collector, or comptroller, of ſuch port, that the ſaid cordage is of Britiſh manufacture, and made of hemp imported from foreign parts, or from hemp of the growth of Great Britain, and not from hemp of the growth or produce of the Britiſh colonies or plantations in America; and exported, or intended to be exported, to parts beyond the ſeas, and not relanded, or intended to be relanded, in any part of Great-Britain or the Iſle of Man.

And the exporter, with one or more perfon or perfons muft give fufficient fecurity, to the faid cuftomer or collector of the port, in a penalty of the value of the goods, that fuch cordage fo fhipped, or any part thereof, fhall not be relanded, or brought on fhore again, in any port or place of Great-Britain or the Ifle of Man: and fuch fecurity fhall be difcharged in the manner hereafter mentioned; that is to fay, for fuch of the faid goods as fhall be entered for, or landed in, the kingdom of Ireland, the iflands of Guernfey, Jerfey, Alderney, or Sark, the condition of the bond fhall be, to bring in a certificate in difcharge thereof within fix months from the date of the bond; and within eighteen months for fuch of the faid goods as fhall be entered for, or landed in, any of his majefty's plantations in America or Africa; and within thirty months for fuch of the faid goods as fhall be entered for, or landed in, any port or place at or beyond the Cape of Good Hope: which faid certificate, for fuch cordage as aforefaid as fhall be landed in any port or place where any officer of his majefty's cuftoms fhall be refident, fhall be figned by the proper officer of his majefty's cuftoms there, importing that fuch goods were there landed, and teftifying the landing thereof; and, for fuch cordage as fhall be entered for the iflands of Jerfey, Guernfey, Alderney, or Sark, the faid certificate fhall be figned by the proper officer of his majefty's cuftoms, if any fuch officer fhall be refiding in thofe iflands refpectively; and, for want of fuch officer refiding there, then by the governor of thofe iflands, or the deputy-governor thereof refpectively; and, for fuch cordage as fhall be entered for any other foreign port or place, a certificate muft be brought under the common feal of the chief magiftrate in fuch place, or under the hands and feals of two known Britifh merchants then being at fuch port or place, that fuch cordage was there landed; or fuch bond or bonds fhall be difcharged, upon proof, in either of the faid cafes, that fuch goods were taken by enemies, or perifhed in the feas; the examination and proof thereof being left to the judgement of the commiffioners of the cuftoms in England or Scotland refpectively for the time being.

Any fearcher, or other proper officer of the cuftoms, after the entry of any of the faid goods, and before or after the fhipping thereof, may open and ftrictly examine any ball, quoil, or other package, as now by law they may do, to fee if the goods are right entered; and, if the fame fhall be found to be right entered, the officer fhall, at his own charge, caufe the fame to be repacked to the fatisfaction of the exporter; but, in cafe the faid officer fhall find goods, or any part thereof, entered under a wrong denomination, or to be lefs in quantiy than expreffed in the exporter's indorfement upon the entry of fuch cordage, all fuch goods, fo wrong entered, fhall be forfeited, and may be feized, and the exporter or owner of fuch goods fhall alfo forfeit the value thereof.

If any difpute fhall arife, whether the fame was made in Great-Britain, or is entitled to the bounty granted by this act, the *onus probandi* fhall lie on the exporter, claimer, or owner thereof, and not on the officer.

If any of the faid cordage fhipped to be exported, for which allowance is hereby made, fhall be relanded or unfhipped in any port or place in Great-Britain or the Ifle of Man, contrary to the true intent or meaning of this act, without the licence of one or more of the principal officers of fuch port or place firft had and obtained, or unlefs it be in cafe of diftrefs, to fave the faid goods from perifhing, the goods (over and above the penalty of the bond) and treble the value of fuch goods fhall be forfeited and loft.

The faid allowance fhall be paid out of money arifing from cuftoms and other duties upon hemp imported, or to be imported, from parts beyond the feas; and in cafe any collector of the cuftoms, in any out-port in South Britain, or of any port in North Britain, fhall not have money fufficient in his hands to pay fuch bounty, then every fuch collector fhall, if thereunto required, forthwith, without

fee or reward give, to the perfon entitled to fuch bounty, a certificate under his hand, attefted by the comptroller, certifying, to the commiffioners of his majefty's cuftoms in London, if fuch cordage is exported from any port in that part of Great-Britain called England, or to the commiffioners of his majefty's cuftoms at Edinburgh, if fuch cordage is exported from any port in that part of Great-Britain called Scotland, that he hath not money fufficient to pay the faid bounty, and alfo what is due for the fame to fuch perfon; and upon producing fuch certificate, and the debenture of the cordage exported, the faid refpective commiffioners of the cuftoms fhall caufe to be paid, without fee or reward, by the receiver-general or cafhier of the cuftoms, at London or Edinburgh refpectively, to the perfon producing every fuch certificate and debenture, the fum of money fo certified to be due, out of the monies arifing from any of the duties, revenues, and cuftoms, under the management of fuch refpective commiffioners; and if the receiver-general or cafhier of the cuftoms, at Edinburgh, fhall not have money fufficient in his hands to pay the bounty fo certified to be due, the commiffioners of his majefty's cuftoms at Edinburgh, or any three of them, fhall forthwith, without fee or reward, give fuch exporter, or feller for exportation, a certificate, certifying the fame to the commiffioners of his majefty's cuftoms at London, which certificates being affixed to the debentures for the bounty of the faid cordage fo exported, and being produced to the faid commiffioners of his majefty's cuftoms at London, they are required to caufe the money thereby certified to be due to be paid by the receiver-general or cafhier of the cuftoms, without fee or reward, out of the monies that fhall be in his hands arifing from any of the duties, revenues, and cuftoms, payable on foreign rough hemp, under the management of the faid commiffioners at London.

The bounty given by this act fhall not extend to cordage re-manufactured from any fort of old cables, old ropes, or old cordage whatfoever, commonly called twice-laid cordage.

In cafe any of the cuftoms or other duties now payable on the importation of foreign rough hemp fhall be redeemed, or otherwife ceafe to be payable, fo much of the allowance, to be made on the exportation of the cordage before mentioned, fhall be abated, as fhall bear a proportion to the cuftoms or duties fo redeemed, or that fhall ceafe to be payable on rough hemp.

All drawbacks, payable upon the exportation of foreign rough hemp from this kingdom, fhall ceafe, determine, and be no longer paid or payable.

The feveral penalties and forfeitures, in this act mentioned, may be profecuted in any of his majefty's courts of record at Weftminfter, or in the court of exchequer at Edinburgh refpectively; and one moiety thereof fhall be to the ufe of the king, and the other moiety to fuch officer of the cuftoms as fhall fue or profecute for the fame.

If any action fhall be commenced againft any perfon for any thing done in purfuance of this act, the defendant may plead the general iffue, and give the fpecial matter in evidence; if the plaintiff be nonfuited or difcontinue his action after the defendant fhall have appeared, or if judgement fhall be given upon any verdict or demurrer againft the plaintiff, the defendant fhall recover treble cofts.

The preceding act would have expired but for the following one, which revived it for four years, and amended it.

Abſtract of an Act to revive, continue, and amend, ſo much of an Act, made in the ſixth Year of the Reign of his preſent Majeſty, intitled "AN ACT FOR ALLOWING A BOUNTY ON THE EXPORTATION OF BRITISH-MADE CORDAGE, AND FOR DISCONTINUING THE DRAWBACKS UPON FOREIGN ROUGH HEMP EXPORTED," as relates to allowing a Bounty on the Exportation of Britiſh-made Cordage. 26. Geo. 3. c. 85.

Such part of the preceding act as relates to allowing a bounty upon the exportation of Britiſh-made cordage ſhall be revived for the term of four years, and thence to the end of the then next ſeſſion of parliament, ſubject to the ſeveral amendments, alterations, regulations, and reſtrictions, herein after provided and expreſſed.

No bounty ſhall be allowed or paid upon the exportation of cordage wrought up and manufactured in Great-Britain from hemp of the growth of the Britiſh colonies or plantations in America, or of the United States of America, nor for any cordage whatever which ſhall be exported, unleſs the quantity thereof ſhall be three tons weight at the leaſt.

Upon the entry for exportation, in order to obtain the bounty, the exporter ſhall make oath that the ſame is really and truly intended to be exported as merchandize, and not for the uſe of the ſhip during her then voyage, or any future voyage; and the maſter or commander of the ſhip or veſſel ſhall join in the bond required to be given for the due exportation of ſuch cordage, or, on failure thereof, no bounty ſhall be paid.

Nothing in this or any other act contained ſhall extend to diſallow the bounty on the due exportation of ſuch cordage to any foreign port or place whatever, except the Iſle of Man, but that the ſame ſhall be and is hereby required to be paid on ſuch exportation, other than to the Iſle of Man.

Every ſhip or veſſel, on-board of which any cordage ſhall be ſhipped for exportation, in order to obtain the bounty herein before granted, ſhall have on-board (over and above the quantity entered for exportation) a ſufficient quantity of cordage for the uſe of ſuch ſhip or veſſel, according to the nature of the voyage, for which no bounty ſhall be allowed; and ſuch ſhip or veſſel, before clearing at any port in the kingdom, ſhall be viſited by the proper officer of the cuſtoms, who ſhall not permit her to ſail, if there be not on-board a ſufficient quantity of cordage for the uſe of ſuch ſhip or veſſel, independent of and beſides the quantity entered for the bounty; and ſuch ſhip or veſſel ſhall not ſail upon her intended voyage until there ſhall be provided a ſufficient quantity of cordage for the uſe of ſuch ſhip or veſſel.

No entry ſhall be permitted to paſs for the exportation of any ſuch cordage, or the veſſel having on-board ſuch cordage be permitted to go out of port, unleſs a certificate ſhall be produced, under the hands of the commiſſioners of his majeſty's navy, or any three or more of them, ſignifying that ſuch cordage hath been tendered to them for the uſe of his majeſty's dock-yards, at the fair and then market price of ſuch cordage in London, and that the ſame hath been refuſed by that board; and if any perſon or perſons ſhall paſs any entry for ſuch cordage, without having ſuch certificate produced to him or them, ſuch perſon or perſons ſhall forfeit and loſe the ſum of one hundred pounds.

Theſe two acts have been continued for the further ſpace of four years by the 31 Geo. 3. c. 43.

Upon the importation of cordage tarred or untarred there is payable a duty of 8s. 6d. per cwt. and no drawback allowed upon exportation: and there is a farther ſcavage-rate in the port of London of one penny per cwt. of 112 lbs. upon the importation of cable ropes for cordage.

Old ropes may be imported duty free.

A CORDAGE TABLE.

ROPES, cable laid, have 9 ftrands, each containing an equal number of threads: they are divided in three, and made into three larger ftrands, which laid (or twifted) together make the rope. Example: a rope, cable laid, 8 inches in circumference, has 333 threads, equally divided, and laid into 9 ftrands; thefe 9 ftrands, being equally divided in 3, are laid into 3 larger ftrands, which, when laid together, make a rope 8 inches in circumference; and fo in proportion for all fizes. 30 fathoms of yarn make 18 fathoms of rope cable laid, and fo in proportion.

Ropes, hawfer laid, have 3 ftrands, with an equal number of threads in each, as the fize of the rope may require. Example: a rope, hawfer laid, 8 inches in circumference, has 414 threads, equally divided in 3, and laid into 3 ftrands, which 3 ftrands, when laid together, make a rope of 8 inches in circumference; and fo in proportion for all fizes. 30 fathoms of yarn make 20 fathoms of rope hawfer laid, and fo in proportion.

The number of yarns given, for ropes of any fize, muft allow of 9 equal divifions if cable laid, and 3 equal divifions if hawfer laid, that all the ftrands may be alike. Ropes of 1 inch to 2½ inches in circumference are hawfer laid; of 3 inches to 10 inches, either hawfer or cable laid; and from 10 inches to any greater dimenfion always cable laid. Ropes made on the wheel, and all fhroud or hawfer laid ropes, for the merchant fervice, fhould, when clofed, ftand full 130 fathoms long; if cable laid, 120 fathoms long. Ropes made in the King's yards, if cable laid, ftand 102 fathoms; if hawfer laid, 113 fathoms. Ropes made of fine fpun yarn, laid fmart, are efteemed the ftrongeft, and wear beft.

Size.	Ropes Cable laid, from 20 Thread Yarn.			Ropes Cable laid, from 18 Thread Yarn.			Weight of Ropes 120 Fathoms in Length.	The Length that Ropes of any Dimenfion take to 1 Cwt.			Hawfer laid Ropes from 20 Thrd. Yarn		Bolt Rope Hawfer laid from 25 Thrd. Yarn.		Stays, 4 Strands with a Heart, from 20 Thread Yarn.			
Inches in Circumference.	Threads on the Hook.	Threads in a Strand.	Threads in the Rope.	Threads on the Hook.	Threads in a Strand.	Threads in the Rope.	Pounds.	Fathoms.	Feet.	Inches.	Threads on the Hook.	Threads in the Rope.	Threads on the Hook.	Threads in the Rope.	Inches in Circumference.	Threads on the Hook.	Threads in a Strand.	Threads in the Rope.
1 0	0	0	0	0	0	0	0	480	0	0	3	9	3	9	3½	6	18	72
1 ½	0	0	0	0	0	0	0	213	1	11	6	18	8	24	4	7	21	84
2 0	0	0	0	0	0	0	0	120	0	0	9	27	11	33	4½	9	27	108
2 ½	0	0	0	0	0	0	0	76	4	9	14	42	18	54	5	11	33	132
3 0	6	18	54	5	15	45	252	53	1	11	20	60	25	75	5½	13	39	156
3 ½	8	24	72	6	18	54	336	39	1	11	26	78	34	102	6	15	45	180
4 0	10	30	90	8	24	72	448	30	0	0	35	105	44	132	6½	17	51	204
4 ½	12	36	108	10	30	90	560	23	3	6	44	132	56	168	7	20	60	240
5 0	15	45	135	13	39	117	700	19	1	2	54	162	69	207	7½	23	69	276
5 ½	18	54	162	15	45	135	840	15	5	2	65	195	84	252	8	26	78	312
6 0	21	63	189	18	54	162	1008	13	1	11	80	240	100	300	8½	30	90	360
6 ½	24	72	216	21	63	189	1176	11	2	1	91	273	116	348	9	34	102	408
7 0	28	84	252	24	72	216	1372	9	4	9	105	315	133	399	9½	37	111	444
7 ½	32	96	288	28	84	252	1588	8	3	2	122	366			10	43	129	516
8 0	37	111	333	32	96	288	1792	7	3	0	138	414			10½	46	138	552
8 ½	42	126	378	36	108	324	2016	6	3	10	156	468			11	55	165	660
9 0	47	141	423	40	120	360	2268	5	5	6	175	525			11½	60	180	720
9 ½	52	156	468	45	135	405	2520	5	1	10	195	585			12	65	195	780
10 0	58	174	522	50	150	450	2800	4	4	9	216	648						
10 ½	64	192	576	55	165	495	3080	4	2	1								
11 0	70	210	630	60	180	540	3416	3	5	9								
11 ½	76	228	684	66	198	594	3696	3	3	9								
12 0	83	249	747	72	216	648	4032	3	1	11								
12 ½	90	270	810	78	234	702	4368	3	0	5								
13 0	98	294	882	84	252	756	4732	2	5	0								
13 ½	106	318	954	91	273	819	5096	2	3	9								
14 0	114	342	1026	98	294	882	5488	2	2	8								
14 ½	122	360	1098	105	315	945	5880	2	1	8								
15 0	130	390	1170	112	336	1008	6300	2	0	9								
15 ½	139	417	1251	120	360	1080	6720	1	5	11								
16 0	148	444	1332	128	384	1152	7168	1	5	3								
16 ½	157	471	1413	136	408	1224	7616	1	4	7								
17 0	167	501	1503	144	432	1296	8092	1	3	11								
17 ½	177	531	1593	153	459	1377	8568	1	3	4								
18 0	187	561	1683	162	486	1458	9072	1	2	10								
18 ½	198	594	1782	171	513	1539	9576	1	2	4								
19 0	209	627	1881	180	540	1620	10108	1	1	11								
19 ½	220	660	1980	190	570	1710	10640	1	1	6								
20 0	231	693	2079	200	600	1800	11200	1	1	2								
20 ½	243	729	2187	210	630	1890	11760	1	0	10								
21 0	255	765	2295	220	660	1980	12348	1	0	6								
21 ½	267	801	2403	231	693	2079	12936	1	0	2								
22 0	280	840	2520	242	726	2178	13552	0	5	11								
22 ½	294	882	2646	253	759	2277	14168	0	5	8								
23 0	307	921	2763	264	792	2376	14812	0	5	5								
23 ½	320	960	2880	276	828	2484	15456	0	5	2								
24 0	334	1002	3006	288	864	2592	16128	0	4	11								

Taper-laid Tacks from 3 to 10 inches Circumference.

Inches in Circumference.	Threads on the Hook.	Threads in a Strand.	Threads in the Tack.	Fathoms in length.	Weight of each Pair of Tacks. Cwt.	q.	lb.
3	6	18	54	18	0	1	4
3½	8	24	72	20	0	1	19
4	10	30	90	22	0	2	7
4½	12	36	108	24	0	3	2
5	15	45	135	26	1	0	4
5½	18	54	162	28	1	1	12
6	21	63	189	28	1	2	7
6½	25	75	225	31	2	0	18
7	29	87	261	36	2	2	14
7½	33	99	297	36	3	0	0
8	37	111	333	38	3	2	8
8½	42	126	378	42	4	1	5
9	47	141	423	45	5	3	16½
9½	52	156	468	48	6	0	6
10	58	174	522	48	6	3	14

The Number of Threads, Weight in Pounds, and Length in Fathoms and Yards, contained in the different Lines and Twine.
F ftands for Fathoms, Y for Yards.

	Thrds	Weight.	Length.
Bolt Rope Twine	2 & 3	0 ½	200 Y
Cod or Bank Lines	18	3 0	40 F
Cod Lines	15	2 ½	35 F
Cod Lines	12	2 0	30 F
Cod Lines for Home Ufe	12	1 ¼	35 F
Cod Lines, fmall	9	1 ½	30 F
Deep Sea Lines	18	12 0	120 F
Deep Sea Lines, Hawferlaid, R. Navy	12	14 0	85 F
Deep Sea Lines	12	12 0	60 F
Deep Sea Lines, E. India	9	8 0	50 F
Dolphin Line	12	2 ½	50 F
Drum Line, 8 ftrands	16	2 ½	20 F
Drum-fifh Line	9	1 0	25 F
Hambro' Line	12	4 0	25 F
Hambro' Line	9	3 0	25 F
Hambro' Line	6	2 0	20 F
Hammock Lines	3	3 0	50 F
Hand Lead Lines	12	4 0	20 F
Houfe Line	3	1 0	30 F
Jack Lines	9	1 to 2	30 F
Log Lines	12	1 0	30 F
Log Lines	9	1 0	30 F
Log Lines	6	1 0	30 F
Mackrel Line	6	0 ½	25 F
Marline	2	1 0	40 F
Safh Line, 4 ftrands	8	2 0	20 F
Seal Twine	16	1 0	40 F
Seaming Twine	2 & 3	0 ½	450 Y
Sean Twine	3	2 0	900 Y
Sean Lines	18	2 0 to	10 F
Store Twine	2	0 ½	350 Y
Turtle Twine	3	1 0	45 F
Whale Line	24	112 0	100 F
Whipping Twine	2	0 ½	200 Y
Whiting Line	6	0 ½	20 F

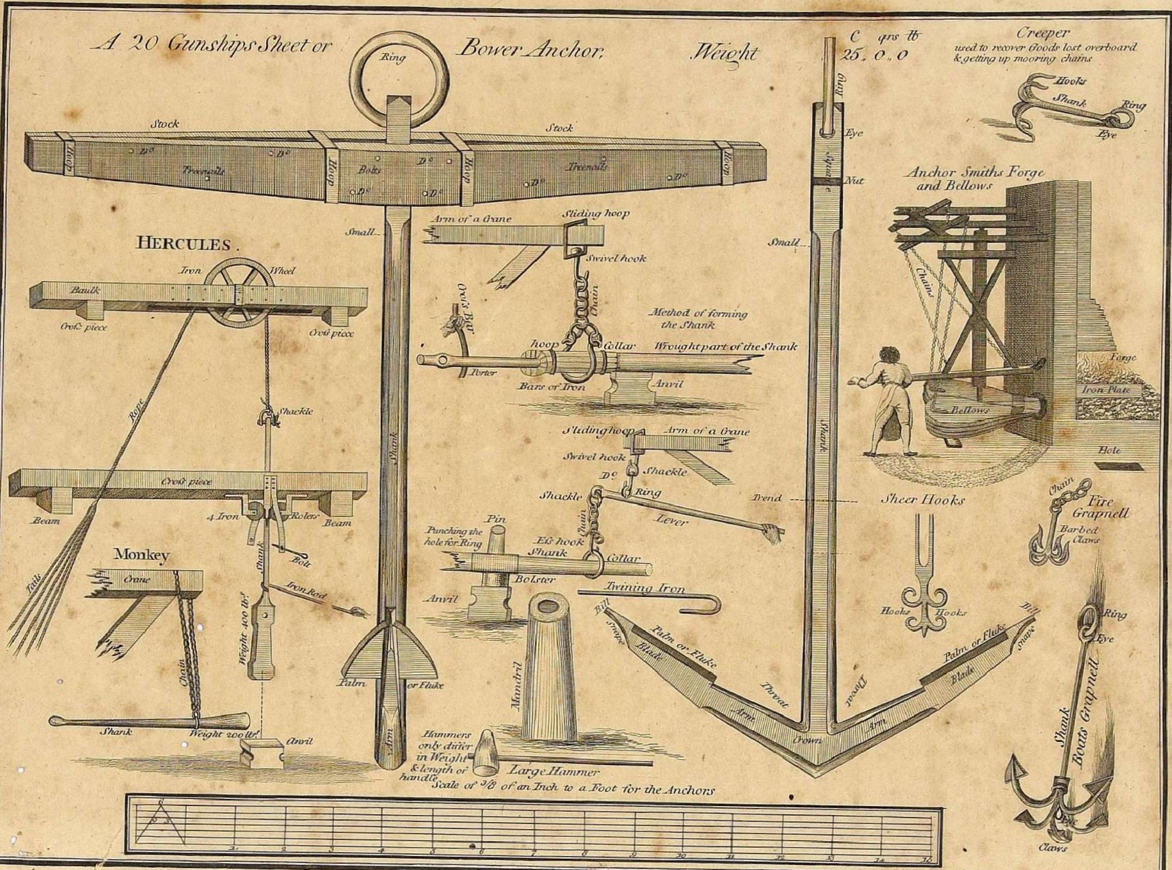
The Number of Cables, and their Sizes, allowed in the Navy, to fhips of each rate.

	110 & 100		98 & 90		80 guns		74 guns		64 guns		50 guns.	
	N°	In.	N°	In.	N°	In.	N°	In.	N°	In.	N°	In.
Bower.	9	24	9	23	8	23	7	23 or 22	7	21	7	19
Stream	1	14	1	13 ½	1	13	1	12 ½	1	11 ½	1	11
	44 guns		38, 36, 32		28 guns		24 guns		20 guns		Sloops.	
Bower.	7	17 ½	7	16 ½	7	16	7	15	6	14 ½	5	13 ½
Stream.	1	10	1	9	1	9	1	8	1	8	1	8

RULE to calculate very nearly the Weight of any Size Rope from 3 to 24 Inches in Circumference, 120 Fathoms long, and leffer Lengths in Proportion; viz. multiply the Size of the Rope by itfelf, and one fourth of that Product is the Weight in Hundreds of 112 Pounds. Example——Suppofe the Rope 10 Inches in Circumference; 10 Times 10 is 100; the Quarter of which is 25 Hundred Weight, or 2800 Pounds, the Weight of 120 Fathoms of Rope 10 Inches in Circumference.

DUTY on CORDAGE, tarred or untarred, imported, 8s. 6d. per Cwt. and no Drawback.—Bounty on the Exportation of Cordage manufactured in Great Britain, not lefs than 3 Tons, 2s. 4d ¼ per Cwt. Old Ropes imported Duty free.

ANCHOR-MAKING.



Pub^d as the Act directs Feby 14th 1793 for D. Steel Bookseller Tower Hill

J. Cooke sc. Mill Hill Midd^x from Clare C^t

DESCRIPTION AND USE OF ANCHORS.

THE TWO PLATES OF ANCHORS WILL, UPON REFERENCE, CLEARLY ELUCIDATE THIS TREATISE ON ANCHOR-MAKING.

Anchors are ſtrong crooked inſtruments, made of iron and wood, uſed at ſea, in rivers, roads, harbours, &c. to retain ſhips and veſſels from danger, or keep them in a convenient ſtation.

The goodneſs of anchors is of material importance, the ſafety and preſervation of the veſſel depending greatly upon them.

An anchor is compoſed of a ſhank, two arms, two flukes, or palms, a ring, and a ſtock, which bear the following proportions. The length of the arm, from the inſide of the throat to the bill, is the diſtance marked on the ſhank for the trend, taken from the inſide of the throat; and three times that is the length of the ſhank from the tip of the crown; and the ſhank, from the tip of the crown to the centre of the ring, is the length of the iron ſtock: when made, the two arms, from the inſide of the throat to the extremity of the bill, ſhould form an arch of a circle containing 120 degrees.

Of anchors there are the ſheet, beſt bower, and ſmall bower; theſe do not vary in form or weight from each other, in the navy. Stream and kedge anchors are ſmaller, and grapnels are for boats only.

DESCRIPTION OF THE TOOLS, AND EXPLANATION OF THE TERMS, USED IN ANCHOR-MAKING.

ANVIL, a maſs of iron on which the work is forged or hammered.

ARM, that part from the crown on which the palm is ſhut.

BILL OR PEAK, the extremities of the arms.

BLADE, that part of the arm on which the palm is ſhut.

BOLSTERS, cylindrical pieces of iron, with a hole through the middle, uſed when holes are to be punched, or opened with pins.

BOLTS, cylindrical iron pins for faſtening the two parts of the ſtock together.

COLLAR, made of iron, forms a ſling ſuſpended by a chain to bear the anchor to and from the fire.

CROSS-BARS are round bars of iron, bent at each end, and uſed as levers to turn the ſhank of the anchor. They are from 3 to 5 feet long, and one inch and a quarter diameter.

CROWN, the loweſt end of the ſhank, where the arms are united.

EYE. The hole at the upper-end of the ſhank for the ring to paſs through.

HAMMERS uſed in making anchors are of 5 ſizes, and only differ in weight and length of handle. They weigh from 26 pounds to 3 pounds, and the handles are in length from 4 feet to 1 foot: and are uſed as the ſize of the work may require.

HANCH. A ſudden diminiſh from a larger ſubſtance to a leſs.

HOOPS. Straps of iron driven on the ſtock.

MANDRELS are circular iron inſtruments, forming a cone 4 feet high, on which hoops are driven to be made perfectly round.

NUTS. Two projections on the ſhank to ſecure the ſtock.

PALM, OR FLUKE. The broadeſt part of the arm of an anchor, terminating in a point to fix in the ground.

PORTER. A ſtraight bar of iron, about 2 inches ſquare, confined at one end to the end of the ſhank: it has holes punched through at the other end for the croſs-bars, which act as levers in turning the ſhank when making.

RING. A circle of iron, in the upper-part of the ſhank of the anchor, to which the cable is bent.

SCARF. The place where one piece is joined to another.

SHANK. The longeſt part of the anchor.

SHUTTING is joining or welding one piece of iron to another.

SMALL of the anchor is that part of the ſhank next under the ſquare.

SNAPE. A ſudden diminiſh of any part.

SQUARE. The upper part of the ſhank.

STOCK is compoſed of two long pieces of oak tapering from the middle, faſtened together with iron hoops and tree-nails, and fixed on the ſhank tranſverſely to the arms.

Some anchors have iron ſtocks.

TREE-NAILS. Wooden pegs to faſten the anchor ſtock.

TREND, that part of the ſhank from which the ſize is taken.

THROAT, the inner-part of the arms, where they join the ſhank.

TWINING-IRONS, ſquare bars, with an eſſ-hook at one end, which graſp the porter or the ſhank to turn it over.

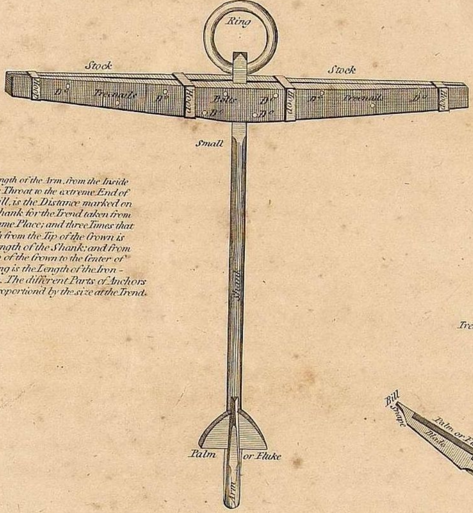
WELDING is forging iron when intenſely heated.

WELDING-HEAT is the ſtrong heat when the iron is propereſt to bind.

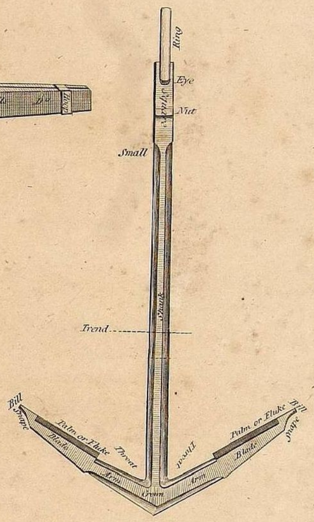
THE PRACTICE OF ANCHOR-MAKING.

THE ſhank, arms, flukes or palms, and ring, are forged ſeperately. The ſhank is made of many long bars of the beſt tough iron, well wrought together; great care ſhould be taken that the iron be neither too ſoft nor too brittle; the latter rendering it liable to break, and the former to ſtraiten. The number of bars, ſufficient to make the ſhank of the ſize deſigned, can only (without the bars be [illegible] an equal ſize) be regulated by experience. Several parts of the anchor are governed by the

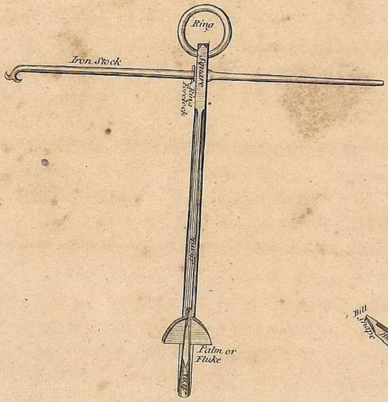
A 20 Gunships Stream Anchor Weight C qrs lb 7 . 2 . 0

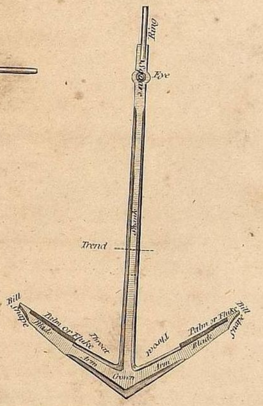


The Length of the Arm, from the Inside of the Throat to the extreme End of the Bill, is the Distance marked on the Shank for the Trend taken from the same Place; and three Times that Length from the Tip of the Crown is the Length of the Shank; and from the Tip of the Crown to the Center of the Ring is the Length of the Iron-Stock. The different Parts of Anchors are proportion'd by the size at the Trend.



A 20 Gunships Kedge Anchor Weight C qs lb 3 . 2 . 0





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ſize of the trend, which is marked on the ſhank at the ſame diſtance from the inſide of the throat as the arm meaſures from the inſide of the throat to the extremity of the bill. The ſhank is rounded to the ſquare of the upper part, and is there called the ſmall round, being the ſmalleſt part. The two ſides in the direction of the arms are flatted ſurfaces, about an inch leſs than the trend, in large anchors, and ſomething leſs, in ſmaller ones.

The ſquared part is the ſame ſize as at the trend each way, and hanches into the ſmall round, one ſixth the length of the ſhank.

The hole, or eye, for the ring, is punched through the ſquare part, on the flatted ſide, once and a half the thickneſs of the ring, from the upper extremity of the ſhank, which has its corners flatted or diamonded, on the ſame ſides, nearly in the middle.

If the ſharp edges of the hole for the ring were rounded off, it would move eaſier and be leſs liable to injury.

Between the hole for the ring and lower part of the ſquare are two ſmall prominences, raiſed acroſs from the ſolid, called nuts, for ſecuring the ſtock in its place. At the lower part of the ſhank is left a ſcarf, or flatted ſurface, with a ſhoulder on each ſide, for ſhutting on the arms.

In making every part of an anchor the niceſt attention ſhould be obſerved, as to its being ſmooth, fair, and even; and that the edges and angles are preſerved ſtraight in their direction, as well-made anchors ſhould poſſeſs beauty as well as ſtrength.

The ring, being previouſly forged, is put through the before-mentioned hole in the ſhank, and the two ends are well ſhut together.

The arms are made of ſhorter bars than the ſhank; but as good in quality, and as well put together; they are rounded and flatted on the different ſides, to reſemble the ſhank; and are the ſame ſize as the ſhank at the throat and ſmall round. The rounding part is continued to the palm, which is nearly in the middle of the arm; from thence it is made with a ſquare tapering to the bill on the flatted ſide; and, on the inner rounded ſide, is made a ſquare ſeat for ſhutting on the palm, that the palm, when ſhut on, ſhould project its thickneſs at the baſe or inner part, the outer part making a ſtraight ſurface with the peek or bill. The back or outer ſide of the arm is made ſtraight from the rounded part, or hanch, to the ſnape; and there kept to half the ſubſtance of the inner part. The ſnape reſembles the bill of a duck, and is one-third the breadth of the palm in length.

The thickneſs of the ring to be half the diameter of the ſmall round.

The diameter of the ring, thickneſs included, reaches from the hole in the upper part of the ſhank to the hanch of the ſmall round.

The inner part of the arm is moſtly made ſtraight, from the bill to the throat: it is thought ſtronger for having a ſmall angle in its length inclining to the ſhank.

Shanks taper in their length, one inch and a half in ſmall anchors, to three inches in large, keeping their proper ſize at the trend; and three quarters of an inch to two inches the flatted way.

The arm in its length inclines to the ſhank, and forms a ſmall angle, the touch or point thereof being in the middle. The throat-end of the arm is ſcarfed, or flatted, to anſwer the ſcarf in the ſhank, to which the two arms are united (after the palms are ſhut on) in the firmeſt manner poſſible, and it is elevated above the horizontal plane, or inclined to the ſhank, that each arm may ſpread at the peek or bill. The length of the arm, from the inſide of the throat to the extremity of its bill, is then taken, and that length from the inſide of the throat is ſet upon the ſhank, and called the trend; from the trend to the bill forms an angle of about 60 degrees.

The palms, or flukes, are two thick plates of iron, made of various pieces, well wrought together, in the form of an iſoſceles triangle; one inch and a half to one inch and a quarter longer on the

breadth of the baſe, and curve about as much in their ſides. The baſe or lower part, to be ſtraight: the inner flat ſurface curves a little in the breadth, but is ſtraight lengthways: the palms, being finiſhed thus far, are laſtly ſhut firmly on to the inner ſide of the arm, in the ſeat before mentioned, the baſe inclining inwards.'

The ſtock is compoſed of two long beams of oak, ſtrongly bolted and treenailed together, and ſecured with four ſtrong iron hoops, two on each ſide of the middle, and one near each end. It is fixed on the upper end of the ſhank, tranſverſely with the flukes or palms; and the nuts are let into the middle of the ſtock.

The length of the ſtock is the length of the ſhank and half the diameter of the ring. The depth and thickneſs in the middle is as many inches as the ſtock is feet in length.

The ends to be kept ſquare, half the depth or thickneſs in the middle. The upper-ſide next the ring is always kept ſtraight, as is the lower-ſide half the depth on each ſide the middle; and thence it tapers to each end in the above proportion. It is neceſſary to leave an opening in the middle of one inch and a half, between the two pieces, that the hoops may be driven nearer the middle, in caſe the ſtock ſhould ſhrink.

The making of anchors is a moſt laborious employ, and has been much facilitated by the invention of two machines, called, the hercules and the monkey, of which ſee the forms in the plate.

The HERCULES is uſed for ſetting ſtraight the ſhank, welding the palms to the arms, and the arms to the ſhank, of large anchors. It conſiſts of a weight of about 400 lb. faced with ſteel, and a long iron ſhank. It is ſuſpended perpendicularly over the work by a rope encircling a ſmall iron wheel fixed in a mortiſe cut in the beam.

It performs its duty by being drawn up about ſeven feet high, by men at the tails of the rope; and, encreaſing in weight by the velocity of its fall, it is found to produce more effect than the moſt powerful exertions with the hammer and ſtrength of man. That the weight may fall on the ſpot required, a long iron rod, with a hook, is occaſionally fixed to the ſhank above the weight, for the workman to direct the ſtroke.

The MONKEY is a machine for ſetting the arms, &c. It conſiſts of a weight of about 200 lb. ſometimes faced with ſteel, and a long iron ſhank ſuſpended by an iron chain to a crane, hanging horizontally againſt the ſide of the work, and it is uſed by being drawn back and thruſt forward by the workmen.

KEDGES, or ſmall anchors, are made in proportion to the large anchors; their ſtocks were formerly of iron but are now moſtly of wood. If iron, they are to be the ſame in length as if wood, and two thirds of the trend in diameter in the middle. Near the middle of the ſtock is a ſhoulder that bears againſt the hole on one ſide the ſquare of the ſhank, with a forelock-hole in the ſtock, on the other ſide the ſquare of the ſhank, for a forelock to go through, to confine the ſtock in its place: it is tapered from the middle each way, and, when put through the ſhank, one end is bent, to prevent its falling out, and to keep it cloſe, when brought to the ſide of the ſhank, for leſs ſtowage.

GRAPNEL, or GRAPPLING, is like a ſmall anchor, with four or five flukes, or claws, uſed in ſmall veſſels or boats to ride at.

FIRE-GRAPNELS reſemble the former, are from eighteen to twenty pounds weight, and have ſtrong barbed claws, with a chain to the ring. They are uſed by fire-ſhips.

CREEPER is like a ſmall anchor, with four hooks, or claws, uſed in recovering any thing from the bottom of rivers, &c.

S[illegible]K HOOKS are of iron, with two prongs, like a fork, and four hooks at the other end, uſed at the extremities of the yards of fire-ſhips to entangle the enemy's rigging, &c.

THE MOST APPROVED DIMENSIONS AND WEIGHT OF ANCHORS.

Weight.	Length of the Shank.		Length of the Arms.		Breadth of the Palms.		Thickness of the Palms.		Size of the Trend.		Size of the small Round.		Outer Diamet. of the Ring.		Thickness of the Ring.	
Cwt.	Ft	In.	Ft	In.	Ft	In.	Ft	In.	Ft	In.	Ft	In.	Ft	In.	Ft	In.
1	5	8	1	10	0	9	0	0 3/4	0	2 1/2	0	2	0	9	0	1
2	6	6	2	2	0	11	0	0 3/4	0	2 3/4	0	2 1/4	0	11	0	1 1/8
3	7	0	2	4	1	0	0	0 7/8	0	3	0	2 1/2	1	0	0	1 1/4
4	7	6	2	6	1	1	0	0 7/8	0	3 1/4	0	2 3/4	1	1	0	1 3/8
5	8	0	2	8	1	2	0	1	0	3 1/2	0	3	1	2	0	1 1/2
6	8	6	2	10	1	3	0	1	0	3 3/4	0	3 1/4	1	3	0	1 5/8
7	9	0	3	0	1	4	0	1	0	4	0	3 1/2	1	4	0	1 3/4
8	9	6	3	2	1	5	0	1 1/8	0	4 1/4	0	3 3/4	1	5	0	1 7/8
9	10	0	3	4	1	6	0	1 1/8	0	4 3/8	0	3 7/8	1	6	0	1 15/16
10	10	4	3	5	1	7	0	1 1/8	0	4 1/2	0	4	1	7	0	2
11	10	8	3	7	1	8	0	1 1/4	0	4 5/8	0	4 1/8	1	8	0	2 1/16
12	11	0	3	8	1	8 1/4	0	1 1/4	0	4 5/8	0	4 1/8	1	8 1/4	0	2 1/16
13	11	4	3	10	1	8 1/2	0	1 1/4	0	4 3/4	0	4 1/4	1	8 1/2	0	2 1/8
14	11	8	3	11	1	8 3/4	0	1 1/4	0	4 7/8	0	4 3/8	1	8 3/4	0	2 3/16
15	12	0	4	0	1	9	0	1 3/8	0	5	0	4 1/2	1	9	0	2 1/4
16	12	3	4	1	1	9 1/8	0	1 3/4	0	5 1/8	0	4 5/8	1	9 1/8	0	2 5/16
17	12	6	4	2	1	9 1/4	0	1 3/8	0	5 1/4	0	4 3/4	1	9 1/4	0	2 3/8
18	12	8	4	3	1	9 1/2	0	1 3/8	0	5 3/8	0	4 7/8	1	9 1/2	0	2 7/16
19	12	10	4	4	1	9 5/8	0	1 1/2	0	5 1/2	0	5	1	9 5/8	0	2 1/2
20	13	0	4	4 1/2	1	9 3/4	0	1 1/2	0	5 5/8	0	5 1/8	1	9 3/4	0	2 9/16
21	13	2	4	5	1	9 3/4	0	1 1/2	0	5 7/8	0	5 1/8	1	9 3/4	0	2 9/16
22	13	4	4	5 3/8	1	10	0	1 1/2	0	6 1/8	0	5 3/8	1	10	0	2 11/16
23	13	6	4	6	1	10 1/4	0	1 1/2	0	6 1/4	0	5 1/2	1	10 1/4	0	2 3/4
24	13	8	4	6 1/2	1	10 1/2	0	1 1/2	0	6 3/8	0	5 5/8	1	10 1/2	0	2 13/16
25	13	10	4	7	1	11	0	1 5/8	0	6 1/2	0	5 3/4	1	11	0	2 7/8
26	14	0	4	8	1	11 1/2	0	1 5/8	0	6 5/8	0	5 7/8	1	11 1/2	0	2 15/16
27	14	2	4	8 1/2	1	11 3/4	0	1 5/8	0	6 5/8	0	5 7/8	1	11 3/4	0	2 15/16
28	14	4	4	9 1/4	1	11 3/4	0	1 5/8	0	6 5/8	0	5 7/8	1	11 3/4	0	2 15/16
29	14	6	4	10	2	0	0	1 3/4	0	6 5/8	0	5 7/8	2	0	0	2 15/16
30	14	7 1/2	4	10 1/2	2	0 1/2	0	1 3/4	0	6 3/4	0	6	2	0 1/2	0	3
31	14	9	4	11	2	1	0	1 7/8	0	6 3/4	0	6	2	1	0	3
32	14	10	4	11 1/2	2	1 1/2	0	1 7/8	0	6 7/8	0	6 1/8	2	1 1/2	0	3 1/16
33	15	0	5	0	2	1 3/4	0	1 7/8	0	7	0	6 1/4	2	1 3/4	0	3 1/8
34	15	1	5	0 1/4	2	2	0	2	0	7 1/4	0	6 1/2	2	2	0	3 1/4
35	15	2	5	0 5/8	2	2 1/2	0	2	0	7 3/8	0	6 5/8	2	2 1/2	0	3 5/16
36	15	4	5	1 1/4	2	2 3/4	0	2	0	7 1/2	0	6 3/4	2	2 3/4	0	3 3/8
37	15	6	5	2	2	3	0	2	0	7 1/2	0	6 3/4	2	3	0	3 3/8
38	15	7	5	2 1/4	2	3 1/2	0	2 1/8	0	7 5/8	0	6 7/8	2	3 1/2	0	3 7/16
39	15	9	5	3	2	3 3/4	0	2 1/4	0	7 5/8	0	6 7/8	2	3 3/4	0	3 7/16
40	15	10	5	3 1/2	2	4	0	2 3/8	0	7 3/4	0	7	2	4	0	3 1/2
41	16	0	5	4	2	4 1/4	0	2 1/2	0	7 3/4	0	7	2	4 1/4	0	3 1/2

Weight.	Length of the Shank.		Length of the Arms.		Breadth of the Palms.		Thickness of the Palms.		Size of the Trend.		Size of the small Round.		Outer Diamet. of the Ring.		Thickness of the Ring.	
Cwt.	Ft	In.	Ft	In.	Ft	In.	Ft	In.	Ft	In.	Ft	In.	Ft	In	Ft	In.
42	16	1	5	4 1/4	2	4 1/2	0	2 1/2	0	7 3/4	0	7	2	4 1/2	0	3 1/2
43	16	2	5	4 1/2	2	5	0	2 1/2	0	7 7/8	0	7 1/8	2	5	0	3 9/16
44	16	3	5	5	2	5 1/4	0	2 1/2	0	7 7/8	0	7 1/8	2	5 1/4	0	3 9/16
45	16	4	5	5 1/4	2	5 1/2	0	2 1/2	0	8	0	7 1/4	2	5 1/2	0	3 5/8
46	16	5	5	5 1/2	2	5 3/4	0	2 1/2	0	8	0	7 1/4	2	5 3/4	0	3 5/8
47	16	6	5	6	2	6	0	2 1/2	0	8 1/8	0	7 3/8	2	6	0	3 11/16
48	16	7	5	6 1/4	2	6 1/4	0	2 1/2	0	8 1/8	0	7 3/8	2	6 1/4	0	3 11/16
49	16	8	5	6 1/2	2	6 1/2	0	2 5/8	0	8 1/8	0	7 3/8	2	6 1/2	0	3 11/16
50	16	9	5	6 3/4	2	7	0	2 5/8	0	8 1/4	0	7 1/2	2	7	0	3 3/4
51	16	10	5	7	2	7 1/2	0	2 5/8	0	8 1/4	0	7 1/2	2	7 1/2	0	3 3/4
52	16	11	5	7 1/2	2	8	0	2 5/8	0	8 1/4	0	7 1/2	2	8	0	3 3/4
53	17	0	5	7 3/4	2	8 1/4	0	2 5/8	0	8 3/8	0	7 5/8	2	8 1/4	0	3 13/16
54	17	1	5	8 1/4	2	8 5/8	0	2 5/8	0	8 3/8	0	7 5/8	2	8 5/8	0	3 13/16
55	17	2	5	8 1/2	2	9	0	2 3/4	0	8 1/2	0	7 3/4	2	9	0	3 7/8
56	17	3	5	9	2	9 1/4	0	2 3/4	0	8 1/2	0	7 3/4	2	9 1/4	0	3 7/8
57	17	4	5	9 1/2	2	9 1/2	0	2 3/4	0	8 1/2	0	7 3/4	2	9 1/2	0	3 7/8
58	17	5	5	9 3/4	2	10	0	2 3/4	0	8 3/4	0	7 7/8	2	10	0	3 15/16
59	17	6	5	10	2	10 1/4	0	2 3/4	0	8 5/8	0	7 7/8	2	10 1/4	0	3 15/16
60	17	7	5	10 1/4	2	10 1/2	0	2 7/8	0	8 3/4	0	7 7/8	2	10 1/2	0	3 15/16
61	17	8	5	10 1/2	2	11	0	3	0	8 3/4	0	8	2	11	0	4
62	17	9	5	11	2	11 1/2	0	3	0	8 3/4	0	8	2	11 1/2	0	4
63	17	10	5	11 1/4	2	11 3/4	0	3	0	8 7/8	0	8	2	11 3/4	0	4
64	17	11	5	11 3/4	3	0	0	3	0	8 7/8	0	8	3	0	0	4
65	18	0	6	0	3	0	0	3 1/8	0	9	0	8	3	0	0	4
66	18	1	6	0 1/4	3	0	0	3 1/8	0	9	0	8	3	0	0	4
67	18	2	6	0 1/2	3	1	0	3 1/8	0	9	0	8	3	1	0	4
68	18	3	6	1	3	1	0	3 1/8	0	9 1/8	0	8	3	1	0	4
69	18	3 1/2	6	1 1/8	3	1	0	3 1/8	0	9 1/8	0	8	3	1	0	4
70	18	4	6	1 1/4	3	1	0	3 1/4	0	9 1/4	0	8 1/8	3	1	0	4 1/16
71	18	5	6	1 1/2	3	1 1/2	0	3 1/4	0	9 1/4	0	8 1/8	3	1 1/2	0	4 1/16
72	18	6	6	2	3	1 1/2	0	3 1/4	0	9 3/4	0	8 1/8	3	1 1/2	0	4 1/16
73	18	8	6	2 1/2	3	1 1/2	0	3 1/4	0	9 3/8	0	8 1/8	3	1 1/2	0	4 1/16
74	18	9 1/2	6	3	3	1 1/2	0	3 3/8	0	9 3/8	0	8 1/8	3	1 1/2	0	4 1/16
75	18	11	6	3 1/2	3	1 1/2	0	3 3/8	0	9 3/8	0	8 1/8	3	1 1/2	0	4 1/16
76	19	0 3/8	6	4 1/8	3	2	0	3 3/8	0	9 3/8	0	8 1/8	3	2	0	4 1/16
77	19	1 3/4	6	4 5/8	3	2	0	3 1/2	0	9 1/2	0	8 3/16	3	2	0	4 1/8
78	19	3 3/8	6	5	3	2	0	3 1/2	0	9 1/4	0	8 3/16	3	2	0	4 1/8
79	19	4 1/2	6	5 1/2	3	2	0	3 1/2	0	9 3/4	0	8 1/4	3	2	0	4 1/8
80	19	6	6	6	3	2	0	3 1/2	0	9 3/4	0	8 1/4	3	2	0	4 1/8
81	19	8	6	6 5/8	3	2 1/2	0	3 5/8	0	10	0	8 1/4	3	2 1/2	0	4 1/8

The Number of Anchors allowed each Ship in the Royal Navy, with their Weight and Value.

S. ſtands for Stream, K. for Kedge.

No.	110 & 100 Guns.		Value.		No.	98 and 90 Guns.		Value.		No	80 and 74 Guns.		Value.		No.	Smaller 74 Guns.		Value.		No.	64 Guns.		Value.	
	Cwt.	Qr	£	s.		Cwt.	Qr	£	s.		Cwt.	Qr	£	s.		Cwt.	Qr	£	s.		Cwt.	Qr	£	s.
5	81	0	1215	0	5	73	0	1003	15	4	71	0	781	0	4	67	0	670	0	4	57	0	502	2
S. 1	21	0	32	11	S. 1	18	0	27	0	S. 1	17	2	26	0	S. 1	16	0	24	0	S. 1	15	0	22	10
K. 1	10	2	15	19	K. 1	9	0	13	10	K. 1	8	2	12	10	K. 1	8	0	12	0	K. 1	7	2	11	0

No.	60 Guns.		Value.		No.	50 Guns.		Value.		No.	44 and 38 Guns.		Value.		No.	36 Guns.		Value.		No.	32 Guns.		Value.	
4	53	0	437	17	4	49	0	382	4	4	40	0	272	0	4	39	0	240	16	4	33	0	210	4
S. 1	12	0	18	0	S. 1	11	0	16	10	S. 1	10	0	15	0	S. 1	9	0	13	10	S. 1	8	1	12	5
K. 1	6	0	9	0	K. 1	5	2	8	0	K. 1	5	0	7	10	K. 1	4	2	6	10	K. 1	4	0	6	0

No.	28 Guns.		Value.		No.	24 and 20 Guns.		Value.		No.	14 Guns, 300 Tons.		Value.		No.	Sloops, 200 Tons.		Value.		No.	Brigs, 200 Tons.		Value.	
4	31	0	198	8	4	29 / 25	2 / 0	180 11 6 / 155 0 0		3	20	0	93	0	3	15	0	67	10	3	12	0	54	0
S. 1	8	0	12	0	S. 1	7	2	11	0	S. 1	7	0	10	10	S. 1	6	0	9	0		Cutter			
K. 1	4	0	6	0	K. 1	3	2	5	0	K. 1	3	2	5	0	K. 1	3	0	4	10	3	10	0	45	0

DIMENSIONS OF GRAPNELS, OR GRAPPLINGS, AND CREEPERS.

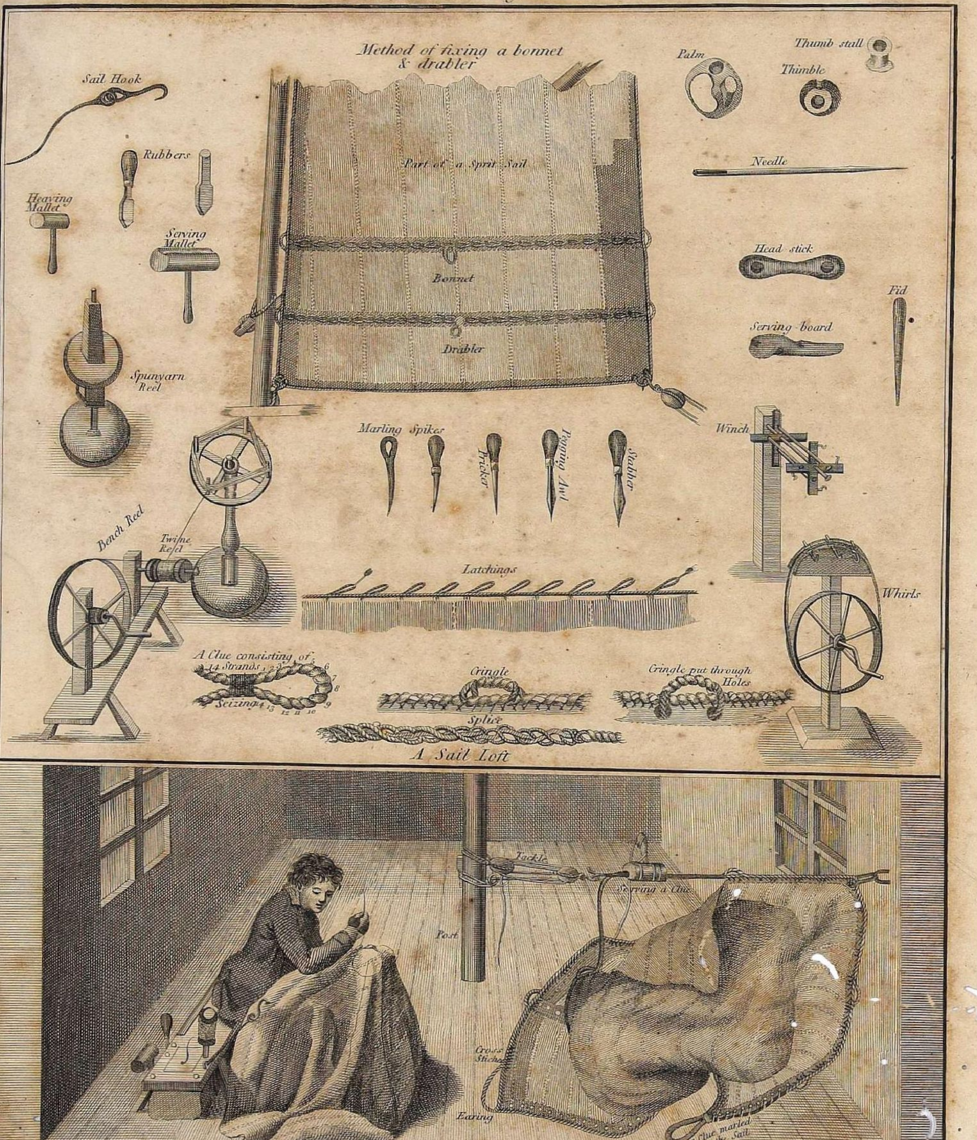
Names, &c. of The Different Parts.	Boat Grapnels. Weight 112 pounds.	Creepers. Weight 28 pounds.	Hand & Chain Grapnels. Weight 28 pounds.
Length of the ſhank to the claws . . .	3 feet	2 feet	1 foot 4 inches
Length of the claws	$\frac{1}{2}$ the length of the ſhank .	$\frac{5}{6}$ the length of the ſhank .	the ſame as the ſhank
Breadth of the fluke	$\frac{1}{3}$ the length of the claw .	. . . .	. . . .
Length of the fluke	$\frac{5}{6}$ the breadth of the fluke	the length of the barb. . .	$\frac{5}{12}$ the length of claw
Thickneſs of the fluke	$\frac{1}{8}$ of an inch to every inch in length	$\frac{1}{8}$ of an inch to every inch in length	$\frac{1}{8}$ of an inch to every inch in length
Diameter of the ſhank at the claws . . .	2 inches and a half . . .	2 inches	2 inches
Diameter of the ſmall round	$\frac{3}{5}$ the diameter at the claws	$\frac{1}{2}$ the diameter at the claws	$\frac{1}{2}$ the diameter at the claws
Diameter of the claws at the ſhank	$\frac{1}{8}$ of an inch larger than the outer part . . .	$\frac{1}{8}$ of an inch larger than the outer part . . .	$\frac{1}{8}$ of an inch larger than the outer part
Diameter of the claws, at the end or fluke . .	ſame ſize as ſmall round .	ſize of the ſmall round .	ſize of the ſmall round
Diameter of the ring, in the clear	$\frac{1}{7}$ of the ſhank	$\frac{1}{6}$ of the ſhank	$\frac{2}{9}$ of the ſhank
Thickneſs of the ring	$\frac{3}{4}$ of the ſmall round . .	ſize of the ſmall round .	$\frac{7}{8}$ of the ſmall round

Boat grapnels are in weight from 112 pounds to 36 pounds. Fire and chain grapnels weigh about 70 pounds, and bear the ſame proportion with the hand and chain; grapnels and creepers are made of wrought-iron, and ſhaped agreeably to the plate. The ſhanks are round, and have an eye wrought in the upper-end, to receive the ring, the ring being put through, and the ends firmly ſhut together. The ſhank is left longer than the nett length above, for welding on the claws. Flukes are ſhut on the extremities of the claws of boat-grapnels, and barbs are made from the ſolid of fire-grapnels. The claws are welded on to the lower-part of the ſhank, and ſpread from the ſame, at the end, one-third the length of the ſhank, in boat-grapnels; three-fourths, in fire-grapnels; and half the length of the ſhank in creepers.

On the importation of anchor-ſtocks, imported in Britiſh ſhips, there is payable a duty of 2s. 3d. each, drawback 2s. 1d. imported in foreign ſhips 2s. 4d. each, drawback 2s. 1d.

SAIL-MAKING.

The Practice of Sail making, with the Tools.



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DESCRIPTION AND USE OF SAILS.

THE FOLLOWING DESCRIPTION OF THE PROPERTIES OF SAILS, THE EXPLANATION OF THE TERMS, AND METHOD OF CUTTING OUT AND MAKING THEM, IS FARTHER ELUCIDATED BY AN ACCURATE ENGRAVING OF EACH SAIL PREFIXED TO THE INSTRUCTIONS, AND IT IS PRESUMED IT WILL BE FOUND REPLETE WITH MUCH USEFUL INFORMATION.

SAILS are made of canvas, of different textures, and are extended on or between the maſts, to receive the wind and force the veſſel through the water. They are quadrilateral or triangular; and are ſkirted round with bolt-ropes, as hereafter deſcribed. Quadrilateral ſails are extended by yards, as the principal ſails; by yards and booms, as ſtudding-ſails; a gaff, as mizen courſes; or by a boom and gaff, as drivers, or boom-mainſails, of brigs, ſloops, &c.

Triangular ſails are ſpread by a ſtay, as ſtayſails; or by a maſt, and ſometimes by a yard, acting as a kind of gaff, as lateen or ſhoulder-of-mutton-ſails : the foremoſt leech, or edge, is attached to the yard, maſt, or ſtay, the whole length.

The ſails of a ſhip or veſſel of 3 maſts are, the courſes or lower ſails; driver; topſails, next above the courſes; topgallant ſails, next above the topſails; and the royals above them: beyond the leeches of the main and fore courſes, topſails, and topgallant ſails, are ſet the ſtuddingſails; and between the maſts, upon the ſtays, are the ſtayſails.

The courſes are the mainſail, foreſail, mizen, and ſpritſail; which are, except the mizen, fixed on their reſpective yards at right angles with the ſhip's length; the mizen is bent to a yard or gaff parallel with the ſhip's length.

The ſails of a veſſel of two maſts are, in a ſnow, ſimilar to thoſe on the fore and main maſts of a ſhip, except the ſail called a tryſail, uſed inſtead of a mizen, which it reſembles; it is extended towards the ſtern, and is faſtened by hoops round a ſmall maſt, called a tryſail maſt, fixed near the aft-ſide of the main-maſt in a block of wood in the quarter deck, at the foot, and attached to the main top at the head.

The ſails of a brig with 2 maſts are alſo ſimilar to thoſe on the main and fore maſts of a ſhip, excepting the main ſail, which is ſet in the plane of her keel, and is extended by a gaff at the head and a boom at the foot; the foremoſt leech being faſtened by hoops round the main-maſt.

Veſſels with one maſt, as ſloops, cutters, ſmacks, hoys, &c. have a main-ſail abaft the maſt, as the brigs; before the maſt they have a ſquare ſail, or croſs-jack; and, above the croſs-jack, a ſmall ſail, called a ſave-all topſail; above that is a topſail, called a ſwallow-tailed topſail, and the next is the topgallant ſail: Some large ſloops have a royal above the topgallant-ſail, and ſtuddingſails beyond the leeches of the ſquare-ſail. Before the maſt is a foreſail, a jib, and a flying jib. Abaft the after leech of the main-ſail, in calm weather, is hoiſted a ring-tail-ſail; over the head of the main-ſail a gaff topſail; and over the ſtern under the boom a water-ſail.

BOATS. Some have a main-fail, forefail, and jib, as in floops; others have lugfails. Some have fpritfails, and lateen or fettee fails, according to their various ufes, the fancy of the owners, or the country to which they belong.

There is an additional part of a fail, called a bonnet: it is laced at the bottom, or foot, of the forefail, tryfail, and ftorm main-fails, of fome veffels with one maft, in moderate winds. It is made like the foot of the fail it is intended for, and has latchings in the upper part, to correfpond with and go through holes in the foot of the fail, by which it is faftened.

In quadrilateral fails, the upper edge is called the head; the fides, or fkirts, are called leeches; and the lower edge is named the foot. If the head is parallel with the foot, the two lower corners are called clues, and the upper corners earings.

In triangular fails, and in quadrilateral ones, where the head is not parallel to the foot, the foremoft corner at the foot is called the tack; the after lower corner, the clue; the upper inner corner, the nock; and the upper outer corner, the peek; the foremoft perpendicular, or goring edge, the fore leech; and the hindmoft, the after leech.

The heads of quadrilateral fails, and the fore leeches or head of triangular fails, are attached to their yards, or gaffs, by a number of fmall cords, called rope-bands, or by a line, called the lacing.

The heads of quadrilateral fails, when not parallel to the foot, lace to the yard or gaff by a line, reeved fpirally through each hole in the head, and round the yard or gaff. The nock and peek are lafhed by the earings.

The fore leech of mizen courfes, drivers, and fore and aft main-fails, lace to the maft by a line, reeved through the holes in the leech, backwards and forwards, on the forefide of the maft, or to hoops round the maft.

Stayfails are extended upon the ftays, between the mafts, with hanks, or grommets, and are drawn up and down as a curtain flides upon its rod; their lower parts are ftretched out by a tack and fheet.

The lower corners of main-fails and forefails of fhips are extended by a tack and a fheet: the foremoft lower corners of fore and aft fails by a tack, and the after lower corners by a fheet.

The clues of a topfail are drawn out to the extremities of the lower yard by two large ropes, called the topfail fheets; the clues of the topgallant-fails are extended upon the topfail yard-arms by the topgallant fheets; and the clues of the royal-fails are lafhed to the topgallant yard-arms.

Studdingfails are fet beyond the fkirts or leeches of the main-fail, forefail, topfail, and topgallant-fail, of fhips, fnows, and brigs. Their upper edges, or heads, are extended by yards; their lower ones, by booms run out beyond the extremities of the yards. Thefe fails are fet in favourable winds and moderate weather, or in chacing.

All fails derive their names from the maft, yard, boom, or ftay, to or upon which they are extended or attached: thus, the principal fail, extended upon the main-maft, is called the main-fail or main courfe; that upon the main-topmaft is termed the main-topfail; that upon the main-topgallant maft is named the main-topgallant fail; and the main-topgallant royal is fo called from its being fpread acrofs the upper part of the main-topgallant maft. The forefail or fore courfe is fo denominated from the foremaft; the fore-topfail from the fore-topmaft; the fore-topgallant fail from the fore-topgallant-maft; and the fore-topgallant royal from being fpread on the upper part of the fore-topgallant maft: the mizen courfe and driver boom fail from the mizen maft; the mizen topfail from the mizen topmaft; the mizen topgallant fail from themi zen topgallant maft; and the mizen topgallant royal from its being fpread on the upper part of the mizen-topgallant maft. The main ftayfail

from the main-ſtayſail-ſtay ; the main-topmaſt ſtayſail from the main-topmaſt preventer ſtay ; middle ſtayſail from the middle ſtayſail-ſtay ; and the main-topgallant ſtayſail from the main-topgallant ſtayſail-ſtay. Theſe ſtayſails are between the main and foremaſts.

The ſtayſails between the main and mizen maſts are, the mizen ſtayſail, the mizen topmaſt ſtayſail, and ſometimes a mizen topgallant ſail above the latter.

The ſtayſails, between the foremaſt and the bowſprit, are the fore ſtayſail, the fore topmaſt ſtayſail, and jib ; (Eaſt India ſhips have two jibs ;) there are, beſides, two ſquare ſails extended by yards under the bowſprit and jib-boom ; that under the bowſprit is the ſpritſail or courſe, and that under the jib-boom the ſprit topſail.

The ſtuddingſails, being extended beyond the different yards of the main and foremaſts, are likewiſe named, according to their ſtations, the lower ſtudding-ſail, the topmaſt ſtudding-ſail, and the topgallant ſtuddingſail.

The ropes, by which the lower yards and ſails are hoiſted to their proper heights on the maſt, are called the jears. The ropes employed for this purpoſe to all other ſails are called haliards.

The principal ſails are expanded by haliards, ſheets, and bowlines ; and the courſes are always ſtretched out below by a tack and ſheet : they are drawn or truſſed up together by buntlines, clue-lines, leech-lines, reef-tackles, ſlab-lines, ſpilling-lines, and brails.

The courſes, topſails, and topgallant-ſails, are wheeled about the maſt, to ſuit the various directions of the wind, by braces : the higher ſtudding-ſails, and, in general, all the ſtay and boom ſails, are drawn down to be furled or reefed by down-haulers.

The ſails of fiſhing-veſſels are generally tanned : lightermen, &c. uſe the following compoſition to colour and preſerve their ſails, viz. horſe greaſe and tar, mixed to a proper conſiſtance, and coloured with red or yellow ochre, with which, when heated, the ſails are payed over.

The following method is alſo much approved, viz. the ſail, being ſpread on the graſs, is made thoroughly wet with ſea-water, and then payed over, on both ſides, with brown or red ochre mixed with ſea-water to the conſiſtence of cream, it is then well rubbed over, on both ſides, with linſeed oil. The ſail may be uſed within 24 hours after being oiled.

The tanning of ſails in the royal navy has been tried, but is not approved of.

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EXPLANATION OF THE TECHNICAL TERMS RELATIVE TO SAILS, AND DESCRIPTION OF THE TOOLS USED IN SAIL-MAKING.

BAG-REEF. A fourth or lower reef, ſometimes uſed in the royal navy.

BALANCE-REEF. A reef-band that croſſes a ſail diagonally, and is uſed to contract it in a ſtorm.

BANDS. Pieces of canvas, from one ſixth to a whole breadth, ſtrongly ſewed acroſs the ſail to ſtrengthen it.

BOLT-ROPE. The rope ſewed on the edges of ſails to prevent their rending. The bolt-rope on the perpendicular or ſloping edges is called the leech-rope; that at the bottom, the foot-rope; and that on the top of the ſail, the head-rope.

BONNET. An additional part of a ſail, made to faſten with latchings to the foot of the ſails of ſome veſſels with one maſt, in moderate winds. It is exactly ſimilar to the foot of the ſail it is intended for.

BOWLINE. A rope faſtened by the bridles to the bowline cringles, on the leech of topſails and other ſquare ſails, to keep tight the windward or weather leech of the ſail.

BRAILS. Ropes to draw up the foot, lower corner, and the ſkirts, of mizen-courſes, and other large fore and aft ſails for furling.

BRIDLES of the bowline. Short ropes, or legs, faſtened to the bowline cringles on the leeches of ſails.

BUNT. The middle-part of the foot of ſquare ſails, and the foremoſt leech of ſtayſails cut with a nock.

BUNTLINE. A rope faſtened to the buntline cringles, on the foot of ſquare ſails, to draw them up to their yards.

BUNTLINE CLOTH. The lining ſewed up the ſail, in the direction of the buntline, to prevent the ſail being chafed.

CANVAS. For the royal navy, canvas or ſail-cloth is 24 inches wide; and 38 yards are called a bolt. To diſtinguiſh the different qualities, each bolt is numbered, and ſhould weigh as follows; No. 1, 44lb. No. 2, 41; No. 3, 38; No. 4, 35; No. 5, 32; No. 6, 29; No. 7, 24; and, No. 8, 21 pounds: from No. 1 to 6 is termed double, and above No. 6 ſingle, canvas.

CLUE. The lower corner of a ſail, where the clue-rope is ſpliced, and the ſheet faſtened.

CLUE-ROPE. A ſhort rope, larger than the bolt-rope on the ſail, into which it is ſpliced, at the lower corners of ſquare ſails, and the after corners of ſtayſails and boomſails. It is there formed into a loop, to which the ſheets are faſtened.

COURSES. The mainſail, foreſail, ſpritſail, and mizen of ſhips.

CRINGLES. Small holes formed on the bolt-ropes of ſails by intertwiſting the ſtrand of a rope, alternately round itſelf and through the ſtrands of the bolt-rope, till it aſſume the ſhape of a ring. To the cringles the end of a rope is faſtened, to haul the ſail up to the yard, &c.

DRABLER. An additional part of a ſail, laced to the bottom of the bonnet of a ſquare-ſail, in Dutch ſloops, &c.

DROP of a ſail. A term ſometimes uſed to courſes and topſails inſtead of depth.

EARINGS. Small ropes uſed to extend the upper corners of ſails to their yards, or gaffs.

FID. A round tapering pin, made of hard wood, to thruſt between the ſtrands of a rope and make a hole to admit the ſtrand of another rope, in ſplicing.

GASKET, A plaited cord uſed to faſten the folded parts of a ſail to the yard, when furling or reefing.

GORES. Angles cut ſlopewiſe at one or both ends of ſuch cloths as widen or increaſe the depth of a ſail.

GROMMET. A ſmall wreath made by ſplicing together the ends of a ſhort piece of rope or line.

HALIARDS. The ropes or tackle employed to hoiſt the yards or ſails.

HANKS. A ſort of wooden rings, formed by the bending of a piece of tough wood, which are confined to the ſtays by notches cut in the ends.

HEADSTICK. A ſhort round ſtick with a hole in each end, ſtrongly ſewed to the head of ſome triangular foreſails and jibs, to prevent the head of the ſail from twiſting; the head-rope is thruſt through the holes before it it ſewed on the ſail.

HEAVING-MALLET. A mallet with a ſmall cylindrical head, uſed as a lever to ſtrain tight the croſs ſtitches and beat them cloſe, when ſewing on the bolt-rope.

HOIST. The foremoſt leeches of ſtayſails and maſt-leech of boom ſails.

HOLES in ſails are made with an inſtrument, called a ſtabber or a pegging-awl, and are fenced round by ſtitching the edge to a ſmall grommet; ſuch are the holes on the head of a ſail for the rope-bands or laceing of ſquare ſails, and for ſeizings on ſails that bend to hoops and hanks. Holes are likewiſe made acroſs the ſail in the reef-bands; at the clues, for marling on the clue-rope; and at the top brims of topſails, for marling on the foot-rope. Holes, when finiſhed, ſhould be ſtretched up with a pricker or marline-ſpike.

HOUSE-LINE. Small line, of 3 threads, uſed to marl the clue-rope at the clues, and to ſeize the corners of ſails.

LACEING. The rope or line uſed to confine the heads of ſails to their yards or gaffs.

LASHING. A ſhort rope uſed to confine one object to another, by ſeveral turns round it and ſecuring the end.

LATCHINGS. Loops formed on the line that is ſewed to the head of a bonnet to connect it with the foot of a ſail: theſe loops are 6 inches aſunder and 6 inches long, except the two middle ones, which are 12 inches long, to faſten off with. The loops are alternately reeved through holes in the foot of the ſail and through each other, and faſten by the two long loops in the middle with two half-hitches, by looſing of which they unreeve themſelves.

LATEEN-SAIL. A triangular ſail, bent at the foremoſt leech to a yard that hoiſts obliquely to the maſt, and is connected with it, at one third the length of the yard.

LEECHES, or ſkirts. The perpendicular or ſloping edges of ſails.

LININGS. The canvas ſewed on the leeches and middle of a ſail to ſtrengthen it.

MARLING. Securing clue-ropes to the clues of ſails, by paſſing a line round the rope and through each marling-hole with a hitch knot.

MARLING-SPIKE. A tapered iron pin, fixed in a ſhort wooden handle, bent towards the point. It is uſed to open the ſtrands of a rope for ſplicing, and to ſtrain tight the ſeizing of clues, &c.

MAST-CLOTH. The lining in the middle on the aft ſide of topſails, to prevent the ſail being chafed by the maſt.

NEEDLES have three ſides towards the point, and are of various ſizes. They bear the following names, viz. large marline, ſmall marline, double bolt-rope, large bolt-rope, ſmall bolt-rope, ſtore, old work, tabling, and flat-ſeam, needles. The needles ſhould be no larger than is neceſſary to carry the twine, and the edges ſhould be taken off, that the canvas may not be cut.

NOCK. The foremoſt upper corner of boomſails, and of ſtayſails cut with a ſquare tack.

PALM. A flat round piece of iron, uſed inſtead of a thimble, and chequered in the middle, to hinder the head of the needle from ſlipping. It is ſewed on a piece of leather or canvas, having a hole for the thumb to go through, which encircles the hand ſo that the iron, when uſed, is againſt the palm.

PARCELLING is encircling a rope, after it is wormed, with narrow pieces of old canvas, well tarred, to make a fair ſurface for the ſerving.

PEEK. The upper corner of triangular ſails, and upper outer corner of fore and aft ſails.

PEGGING-AWL. An inſtrument for making holes with. It has 4 ſharp edges towards the point, and is ſmaller than a ſtabber.

POINTS. Short pieces of flat plaited cordage, tapering from the middle to the ends, uſed to reef the ſquare ſails.

PRICKER. A ſmall inſtrument, like a marline-ſpike, but ſtraight, to make the holes with.

REEF. The portion of ſail contained between the reef-bands and neareſt edge of the ſail, at head or foot.

REEF-BANDS. The bands in which the reef-holes are made, when ſewed acroſs the ſail.

REEF-HANKS. Short pieces of log-line, or other ſmall line, ſewed at certain diſtances on the reefs of boom-ſails.

REEF-TACKLE PENDANT. A rope employed to hoiſt the reef of a topſail to the yard, to reef the ſail.

REELS FOR TWINE are ſhort cylindrical pieces of wood, having the ſides hollowed and a hole bored through the middle. A Bench-reel is ſimilar to a ſpinning-wheel, and is uſed to expedite winding the twine from the ſkains to the twine-reel. A Yarn-reel is a circular board, nailed in the middle to a piece of oak, 4 inches ſquare and 16 inches long, and is uſed to wind ſpunyarn on; through the centre is bored a hole by which it turns round a bolt, as on an axis.

RING-TAIL-SAIL. A ſmall ſail, extended, by a ſmall maſt and a boom, over the ſtern. A boat's main-ſail is generally made to anſwer both purpoſes.

ROACH-LEECH. A term ſignifying the curve on the maſt-leech of ſome fore and aft ſails, &c.

ROPE-BANDS. Short pieces of plaited cordage, uſed to faſten the head of a ſail to its yard.

RUBBER. A ſmall iron inſtrument, in a wooden handle, to rub down or flatten the ſeams.

SAIL-HOOK. A ſmall iron hook, with an eye in one end, to which a cord is ſpliced; it is uſed to confine the work, while ſewing, by hooking on the canvas, the cord being faſtened to ſome convenient place.

SEAMS. The two edges of canvas where laid over each other other and ſewed down.

SEIZING. Joining one part of a rope to another with ſeveral round and croſs-turns of ſmall cord or line.

SELVAGE. The edges of cloth as finiſhed in weaving.

SERVING is winding ſmall line or ſpunyarn tightly round a rope by a mallet, to preſerve it from wet, &c. The line or ſpunyarn being wound up in a ball, two or more turns are taken from it round the rope, confining the end under the turns; the mallet is then placed on the rope, and 2 or more yarns are paſſed round the rope and mallet, and round the handle, then, turning the mallet (whilſt another perſon paſſes the ball round the rope,) it leaves the ſpunyarn on the rope, and draws it tight.

SERVING-MALLET. A wooden inſtrument, compoſed of a ſhort cylindrical head, with a handle through its centre. Along the upper ſurface of the head is cut a circular groove, to fit the convexity of the rope.

SERVING-BOARD. A ſmall piece of board, 7 or 8 inches long and 3 inches broad, tapering to one end as a handle. It has a ſmall notch or groove cut in the middle of the broad end, and one or two on the ſides, in which the ſpunyarn is twiſted. Its uſe is the ſame as the mallet, but for ſmall rope only.

SHEET. A rope to ſpread the foot of a ſail, attached to the clues of ſquare ſails, and the after clue of other ſails, except ſtuddingſails: on them it is faſtened to the inner clue.

SHOULDER-OF-MUTTON-SAIL is triangular, ſimilar to the lateen ſail, but is attached to a maſt inſtead of a yard.

SLACK-CLOTH. A certain quantity of cloth, allowed to be gradually gathered up, in ſewing on the bolt-rope to the ſail, more than the length of bolt-rope; otherwiſe the rope, by ſtretching in the wearing, might occaſion the ſail to ſplit.

SLIDING-GUNTER-SAIL. A triangular ſail, uſed in boats, bent at its foremoſt leech to hoops or grommets that ſlide on the lower maſt: the peek or head is attached to a ſmall topmaſt, that ſlides up, in the direction of the lower-maſt, through two hoops fixed, at its head, about three feet aſunder. When the topmaſt is lowered, the ſail furls cloſe up to the lower maſt.

SPLICE. Two ends of a rope joined neatly together, by opening the ſtrands and placing them equally in each other, and thruſting the ends through the intervals of the oppoſite ſtrands alternately, the opening being previouſly made with a fid or marline-ſpike.

SPUNYARN. Three or four yarns of half-worn rope, tarred and twiſted together by a winch or whirls.

STABBER. An inſtrument ſimilar to a pricker, only being triangular inſtead of ſquare.

STAY. A large rope employed to ſuſtain the maſt, by extending from its upper part towards the fore part of the ſhip, where it is ſecurely faſtened.

STAY-HOLES. Holes made through ſtayſails, at certain diſtances along the hoiſt, through which they are ſeized to the hanks on the ſtay.

STUCK. The term uſed for being ſtitched.

TABLING. A broad hem made on the ſkirts of ſails, by turning the edge over and ſewing it down. It is to ſtrengthen the ſail for ſewing on the bolt-rope.

TABLED. The edges turned over and ſewed down.

TACK. A rope uſed to confine the clues of the mainſail and foreſail forward occaſionally in a fixed poſition, and alſo to confine the foremoſt lower corners of ſtayſails, boomſails, and foreſails of ſloops; and the outer lower corners of ſtuddingſails.

TACK OF A SAIL. That place to which the tack is faſtened.

THIMBLE. An iron ring, having a groove formed in its outer circumference. Thimbles are fixed in the cringles of ſails where iron hooks are uſed, as the hook of a tackle, &c.

THUMB-STALL. A ferrule, made of iron, horn, or leather, with the edges turned up, to receive the thread in ſewing. It is worn on the thumb to tighten the ſtitches.

TOP-BRIM. A ſpace in the middle of the foot of a topſail, containing one-fifth of the number of its cloths. It is ſo called from its ſituation, being near the fore part of the top, or plat-form on the maſt, when the ſail is extended.

TOP-LINING. The lining ſewed to the aftſide of topſails, to preſerve the ſail from the chafing of the top.

TWINE is of two ſorts, extra and ordinary; the extra is for ſeaming, and runs 360 fathoms to the pound; the ordinary is uſed to ſew on the bolt-rope, and runs 200 fathoms to the pound. Twine for the navy is of three threads.

WINCH, to make or twiſt ſpunyarn with, is made of 8 ſpokes, 4 at each end, and 4 wooden pins 15 inches long driven through the end of them. Through the centre of the ſpokes is bored a hole for an iron bolt to paſs through, that ſerves for an axis. The motion is given to the winch by the hand; on the edges of the ſpokes is a ſmall hook to ſtop the yarn when twiſting, after which the ſpunyarn is wound round the body of the winch.

WHIRLS. Short wires with a hook at one end, going through a hole in a cylindrical piece of wood; the wood in which they turn is hollowed on the outſide to receive a ſtrap of canvas or leather: three of theſe whirls are retained by notches cut on the edge of a ſemi-circular rib of wood hollowed on the back, 3 inches ſquare, and 10 inches long, faſtened againſt an upright fixed by a tenon into a large block of wood: a ſpoke wheel, about 3 feet diameter, turns on a large pin, or axis, driven into the middle of the upright; and round this wheel and the woods of the whirls paſſes a tight canvas or leather ſtrap; ſo that turning the ſpoke-wheel puts the whirls in motion, and the yarns, being hung to the hooks, are twiſted together.

WORMING is winding ſmall lines or ſpunyarn along the cuntline of a rope, to produce a fair ſurface for ſerving.

GENERAL RULES AND DIRECTIONS FOR SAIL-MAKING.

INSTRUCTIONS FOR CUTTING OUT SAILS.

SAILS are cut out cloth by cloth. The width is governed by the length of the yard, gaff, boom, or ſtay; the depth by the heighth of the maſt. The width and depth being given, find the number of cloths the width requires, allowing for ſeams, tabling on the leeches, and ſlack cloth; and, in the depth, allow for tabling on the head and foot. For ſails cut ſquare on the head and foot, with gores only on the leeches, as ſome topſails, &c. the cloths on the head, between the leeches, are cut ſquare to the depth; and the gores on the leeches are found by dividing the depth of the ſail by the number of cloths gored, which gives the length of each gore. The gore is ſet down from a ſquare with the oppoſite ſelvage, and, the canvas being cut diagonnally, the longeſt gored ſide of one cloth makes the ſhorteſt ſide of the next; conſequently, the firſt gore being known, the reſt are cut by it.

For the length of gores correſponding to the depth on the ſelvage, ſee the Table of Gores annexed, to theſe directions.

In the leeches of topſails cut hollow, the upper gores are longer than the lower ones; and, in ſails cut with a roach leech, the lower gores are longer than the upper ones. This muſt be regulated by judgment, and care taken that the whole of the gores do not exceed the depth of the leech. Or, by drawing on paper the gored ſide of the ſail, and delineating the breadth of every cloth by a convenient ſcale of equal parts of an inch to a foot, the length of every gore may be found with preciſion. In the ſubjoined plates of ſails, the gore is marked on every cloth.

Sails, gored with a ſweep on the head or the foot, or on both, have the depth of their gores marked on the ſelvage, from the ſquare of the given depth on each cloth, and are cut as above; the longeſt ſelvage of one ſerving to meaſure the ſhorteſt ſelvage of the next, beginning with the firſt gored cloth next the middle, in ſome ſails, and the firſt cloth next the maſt leech, in others.

For thoſe gores that are irregular no ſtrict rule can be given; they can only be determined by the judgment of the ſail-maker, or by a drawing.

In the royal navy, mizen topſails are cut with three quarters of a yard hollow in the foot; but, in the merchant-ſervice, top and topgallant ſails are cut with more or leſs hollow in the foot.

Flying jibs are cut with a roach-curve on the ſtay, and a three-inch gore in each cloth, ſhortening from the tack to the clue.

Lower ſtudding-ſails are cut with ſquare leeches, and topmaſt and topgallant-maſt ſtuddingſails with goring leeches.

For the cutting of all other ſails, we refer to the particular deſcription of each ſail, and to the annexed Tables of Dimenſions.

The length of reef and middle bands is governed by the width of the ſail at their reſpective places; the leech-linings, buntline-cloths, top-linings, maſt-cloths, and corner-pieces, are cut agreeably to the depth of the ſail; each cloth and every article ſhould be properly marked with charcoal, to prevent confuſion or miſtake.

Sails that have bonnets are cut out the whole depth of the ſail and bonnet included, allowing enough for the tablings on the foot of the ſail and head and foot of the bonnet. The bonnet is cut off after the ſail is ſewed together. If a drabler is required, it is allowed for in the cutting out the ſame as the bonnet.

INSTRUCTIONS FOR SAIL-MAKING.

SEAMS. Sails have a double flat ſeam, and ſhould be ſewed with the beſt Engliſh-made twine of three threads, ſpun 360 fathoms to the pound, and have from one hundred and eight to one hundred and ſixteen ſtitches in every yard in length.

The twine for large ſails, in the royal navy, is waxed by hand, with genuine bees-wax, mixed with one ſixth part of clear turpentine; and, for ſmall ſails, in a mixture made with bees wax, 4lb.; hogs lard, 5lb; and clear turpentine, 1lb. In the merchant-ſervice, the twine is dipped in tar, ſoftened with a proper proportion of oil.

It is the erroneous practice of ſome ſail-makers not to ſew the ſeams any farther than where the edge is creaſed down for the tabling; but all ſails ſhould be ſewed quite home to the end, and, when finiſhed, ſhould be well rubbed down with a rubber.

In the merchant-ſervice, ſeams are ſometimes made broader at the foot than at the head, being ſtronger.

Broad ſeams are not allowed to be made on courſes, in the royal navy, but goring leeches are adopted in lieu of them. Boom-mainſails and the ſails of ſloops generally have the ſeams broader at the foot than at the head.

The ſeams of courſes and topſails are ſtuck or ſtitched up, in the middle of the ſeams, along the whole length, with double ſeaming-twine; and have from 68 to 72 ſtitches in a yard. In the merchant-ſervice, it is common to ſtick the ſeams with two rows of ſtitches, when the ſail is half worn, as they will then laſt till the ſail is worn out.

The breadth of the ſeams of courſes, topſails, and other ſails, in the royal navy, to be as follow, viz. courſes and topſails, for 50 gun ſhips and upwards, one inch and a half, and, for 44 gun ſhips and under, one inch and a quarter, at head and foot: all other ſails, one inch at head and foot.

TABLINGS. The tablings of all ſails are to be of a proportionable breadth to the ſize of the ſail, and ſewed at the edge, with 68 to 72 ſtitches in a yard. Thoſe for the heads of main and fore courſes to be four to ſix inches wide; for ſprit courſes and mizens, drivers, and other boom-ſails, 3 to 4 inches wide; for topſails, 3 inches to 4 inches and a half; topgallant and ſprit topſails, 3 inches; royal ſails, 2 inches and a half; jib and other ſtayſails, 3 inches to 4 inches and a half, on the ſtay or hoiſt; and, for ſtudding-ſails, 3 inches to 4 inches on the head.

Tablings on the foot and leeches of main and fore courſes to be 3 inches to 5 inches broad; ſprit courſe and topſails, 3 inches; topgallant and ſprit topſails, 2 inches and a half; royals, 2 inches: fore leeches of mizen, driver, and other boomſails, 3 inches and a half to 4 inches, after leech, 3 inches; and on the foot 2 or 3 inches.

Tablings on the after leech of jibs and other ſtayſails to be from 2 to 3 inches broad; and, on the foot, 2 to 2 inches and a half: on ſtudding-ſail leeches one inch and a half to two inches and a half; and, on the foot, from one to two inches.

LININGS. Main and fore courſes are lined on the leeches, from clue to earing, with one cloth, ſeamed on, and ſtuck, or ſtitched, in the middle; and have a middle-band half-way between the lower reef-band and the foot; alſo four buntline-cloths, at equal diſtances between the leeches, the upper-end of which

are carried under the middle-band, that the lower ſide of the band may be tabled upon, or ſewed over, the end of the buntline-pieces. They have likewiſe two reef-bands; each, in breadth, one third of the breadth of the canvas; the upper one is one ſixth of the depth of the ſail from the head, and the lower band is at the ſame diſtance from the upper one; the ends go four inches under the leech linings, which are ſeamed over the reef-bands.

All linings are ſeamed on, and are ſtuck, with 68 to 72 ſtitches in a yard.

Main, fore, and mizen, topſails have leech linings, maſt and top linings, buntline-cloths, middle bands and reef bands. The leech linings are made of one breadth of cloth, ſo cut and ſewed as to be half a cloth broad at the head, and a cloth and a half broad at the foot; the piece cut out being half the breadth of the cloth at one end, and tapering to a point at the other.

The middle-bands are put on half-way between the lower reef and foot; the buntline-cloths join the top-linings; and the buntline-cloths and top-linings are carried up to the lower ſide of the middle band, which is tabled on them.

The maſt-lining is of two cloths, and extends from the foot of the ſail to the lower reef, to receive the beat or chafe of the maſt.

The middle-band is made of one breadth of canvas, of the ſame number as the toplining. It is firſt folded and rubbed down, to make a creaſe at one third of the breadth; then tabled on the ſelvage, and ſtuck along the creaſe; then turned down, and tabled and ſtuck through both the double and ſingle parts, with 68 to 72 ſtitches in a yard.

It is the opinion of many, that middle-bands ſhould not be put on until the ſail is half worn.

Main and fore topſails have three and ſometimes four reef-bands from leech to leech, over the leech linings; the upper one is one eighth of the depth of the ſail from the head, and they are the ſame diſtance aſunder, in the royal navy, but more in the merchant-ſervice. The reef-bands are each of half a breadth of canvas, put on double; the firſt ſide is ſtuck twice, and the laſt turned over ſo that the reef-holes may be worked upon the double part of the band, which is alſo ſtuck with 68 to 72 ſtitches in a yard.

The toplining of topſails is of canvas, No. 6 or 7. The other linings of this, and all the linings of other ſails, ſhould be of the ſame quality as the ſails to which they belong.

Top-linings and maſt-cloths are put on the aftſide, and all other linings on the fore-ſide, of ſails.

Mizens are lined with one breadth of cloth from the clue five yards up the leech, and have a reef-band ſewed on, in the ſame manner as on other ſails, at one fifth the depth of the ſail from the foot; they have alſo a nock-piece and a peek-piece, one cut out of the other ſo that each contains one yard.

Mizen topſails, of 50 gun ſhips and upwards, have three reefs, the upper one is one eighth of the depth of the ſail from the head, and the reefs are at the ſame diſtance aſunder. Mizen topſails, of ſhips of 44 guns and under, have two reefs one ſeventh part of the depth of the ſail aſunder, the upper one being at the ſame diſtance from the head.

Main and main top ſtudding-ſails have each one reef, at one eighth of the depth of the ſail from the head.

Reef-bands ſhould not be put on until the ſail is ſewed up, a contrary practice being very erroneous.

Lower ſtayſails, fore top and main top ſtayſails, and flying jibs, have clue-pieces two yards long.

Square tack-ſtayſails have half a breadth of cloth at the fore part, with a clue-piece containing two yards, and a peek-piece, containing one yard.

HOLES are made by an inſtrument called a pegging awl, or a ſtabber, and are fenced round by ſtitching the edge to a ſmall grommet, made with log or other line; when finiſhed, they ſhould be well ſtretched or rounded up by a pricker or a marline-ſpike.

Sails have two holes in each cloth, at the heads and reefs of courfes, topfails, and other fquare fails; one hole in every yard in the ftay of flying jibs; and one in every three quarters of a yard in the ftays of fquare tack and other ftayfails.

Reef and head holes of large fails have grommets of 12-thread line, worked round with 18 to 21 ftitches; fmaller fails have grommets of 9-thread line, with 16 to 18 ftitches, or as many as fhall cover the line, and fmaller holes in proportion.

The holes, for marling the clues of fails and the top-brims of topfails, have grommets of log-line, and fhould have from 9 to 11 ftitches; twelve holes are worked in each cloth.

Main courfes have marling-holes from the clue to the lower bow-line cringle up the leech; and from the clue to the firft buntline-cringle on the foot. Fore-courfes have marling-holes one-eighth of the depth of the fail up the leech, and from the clue to the firft buntline cringle at the foot. Main and fore topfails have marling-holes three feet each way from the clue, and at the top-brims. Spritfails, mizen topfails, lower ftayfails, main and fore top ftayfails, and jibs, have marling-holes two feet each way from the clues. All other fails are fewed home to the clues.

Marling-holes of courfes are at three fourths of the depth of the tablings at the clues from the rope; and thofe of topfails are at half the depth of the tablings at the clues, and top-brim, from the rope.

BOLT ROPE fhould be well made, of fine yarn, fpun from the beft Riga rhine hemp well topt, and fewed on with good Englifh-made twine of three threads, fpun 200 fathom to the pound; the twine in the royal navy is dipped in a compofition made with bees-wax, 4lb; hogs lard, 5lb; and clear turpentine one pound; and, in the merchant-fervice, in tar foftened with oil.

THE NUMBER OF YARNS IN EACH STRAND OF BOLT-ROPES, AND THREADS FOR SEWING THEM ON, REQUIRED BY GOVERNMENT.

Size of the rope in inches.	Threads in each ftrand.	Threads to few them on.		Size of the rope in inches.	Threads in each ftrand.	Threads to few them on.	
		Ordinary.	Extra.			Ordinary.	Extra.
6	98	10	2	$3\frac{1}{4}$	29	4	2
$5\frac{3}{4}$	90	10	0	3	25	4	2
$5\frac{1}{2}$	83	10	0	$2\frac{3}{4}$	21	4	0
$5\frac{1}{4}$	75	8	2	$2\frac{1}{2}$	17	4	0
5	68	8	2	$2\frac{1}{4}$	14	2	2
$4\frac{3}{4}$	62	8	0	2	11	2	2
$4\frac{1}{2}$	56	8	0	$1\frac{3}{4}$	9	2	0
$4\frac{1}{4}$	50	6	2	$1\frac{1}{2}$	7	2	0
4	44	6	2	$1\frac{1}{4}$	5	2	0
$3\frac{3}{4}$	39	6	0	1	3	2	0
$3\frac{1}{2}$	34	6	0	—	—	—	—

Bolt-ropes of courfes, topfails, and all other fails, fhould be neatly fewed on through every cunt-line of the rope; and, to avoid ftretching, the rope muft be kept tightly twifted while fewing on, and care taken that neither too much nor too little flack is taken in: they are to be crofs ftitched at the leeches, every 12 inches in length; at every feam, and in the middle of every cloth at the foot, with three crofs-ftitches: four crofs-ftitches fhould be taken at all beginnings and faftenings off the firft ftitch given twice, and the laft three times. Small fails have two crofs-ftitches at every feam, and three at every faftening off.

Annexed is a table of the fizes of bolt-ropes for every fail.

On main and fore courfes two inches flack cloth fhould be allowed in the head and foot, and one inch and a half in the leeches, in every yard in length.

Topſails are allowed 3 inches ſlack in every cloth in the foot, and one inch and a half in every yard in the leech, and 2 inches in every cloth left open in the top-brim.

Mizen courſes have two inches ſlack in every yard in the foremoſt leech, but none in the after leech or foot.

Spritſail courſes have no ſlack cloth.

Jibs have four inches ſlack in every yard in the ſtay, one inch in every cloth in the foot, and none in the leech.

Stayſails have 3 inches ſlack in every yard in the ſtay, one inch in every cloth in the foot, but none in the leech.

Topgallant-ſails have two inches ſlack in every cloth in the foot, and one inch in every yard in the leech.

Studding-ſails have an inch and a half ſlack in every yard in goring leeches, but no ſlack in ſquare leeches, and one inch in every cloth in the head and foot.

Bolt-ropes ſhould be ſtoved in a ſtove by the heat of a flue, and not in a baker's oven or a ſtove-tub; and tarred in the beſt Stockholm tar. The flexibility of them ſhould be always conſidered, in taking in the ſlack, which muſt reſt on the judgment of the ſail-maker.

The clues and top-brims ſhould be wormed while the bolt-rope is ſewing to the ſail, and before both parts are confined.

Fourteen turns or twiſts of the ſtrands in the length of the clue rope are left at the lower corners of all ſails for the clues, which are wormed with ſizeable ſpunyarn, ſerved, marled, and ſeized. The clue-ropes of main courſes extend, and are marled, from the clue to the lower bowline-cringle up the leech, and to the firſt buntline-cringle on the foot; on fore-courſes one-eighth of the depth of the ſail up the leech and to the firſt buntline-cringle at the foot: the clue-ropes of main and fore top-ſails extend 3 feet each way on the leech and foot: and ſpritſails, mizen topſails, lower ſtayſails, main and fore top ſtayſails, and jibs, have the clue-rope 2 feet each way from the clue.

Earing-cringles are made of an additional length (of 14 twiſts or turns) of the leech-rope left at the head of the ſail, which, being turned back, forms the cringle by ſplicing its end into the leech-rope and croſs-ſtitching the whole of the ſplice; the firſt ſtitch to be given twice, and the laſt ſtitch 3 times.

Cringles ſhould be made of the ſtrands of new bolt-rope, half an inch ſmaller than the bolt-rope on the ſail.

Splices are made by opening the ends of two ropes, and placing the ſtrands between each other; openings being made in the untwiſted part of the rope neareſt the end with a marline ſpike, the ſtrands are thruſt through them; and the large ends are regularly tapered from the middle by cutting away ſome of the yarns every time they are thruſt through. The ſmall ſtrands, as thoſe of the foot or leech rope, are ſtuck twice through the openings made in the large rope; and the large ſtrands are ſtuck 3 times through the leech or foot rope. The middle ſtrand of the taper, being the longeſt, is ſtuck in laſt, and once more than the others. All ſplices are croſs-ſtitched as far as they run.

Reef and reef-tackle pendant cringles are ſtuck through holes made in the tablings, and the lower ends are put through the bolt-rope once more than the upper ends, being more liable to be drawn out.

The openings of bowline and buntline cringles are at the diſtance of four turns or twiſts of the ſtrands in the bolt-rope aſunder, and the ends are firſt ſtuck in an opening, made with a marline ſpike, under two ſtrands of the bolt-rope; then, paſſing over the next, they are ſtuck under one ſtrand; and again

paſſing over another, they are finally ſtuck under the next. The ends of the buntline cringles, next the ſervice of the clues of courſes, ſhould be left long enough to be worked under the ſervice, to meet or reach the ends of the clue rope. (See plate.)

BONNETS.

Bonnets have a head-tabling, to which a line that forms the latchings is ſewed in bights, which are about 6 inches aſunder; the leeches and foot are tabled, &c. ſimilar to the foot of the ſail the bonnet is intended for.

RULES FOR ASCERTAINING THE QUANTITY OF CANVAS, TWENTY-FOUR INCHES WIDE, CONTAINED IN THE DIFFERENT SAILS.

MAIN AND FORE COURSES, TOPSAILS, TOPGALLANT-SAILS, AND ROYALS.

Add the number of cloths in the head and foot together, and halve them, to make them ſquare; then multiply the number of ſquared cloths by the depth of the ſail, and add to that the additional canvas contained in the foot-gores, linings, bands, and pieces.

MIZEN COURSE.

Add the depth of the fore and after leech together, and halve it for a medium depth; then multiply the number of cloths by the ſame; and add to that the additional canvas contained in the foot-gores, linings, bands, and pieces.

MAIN STAYSAILS, FORE STAYSAILS, JIBS, FORESAILS, AND LATEEN SAILS.

Halve the number of cloths, and multiply them by the depth of the leech; and add to that the additional canvas contained in the foot-gores, linings, bands, and pieces.

MIZEN STAYSAILS, MAIN-TOPMAST-STAYSAILS, MIDDLE STAYSAILS, MIZEN-TOPMAST-STAYSAILS, AND MAIN-TOPGALLANT-STAYSAILS.

Add the depth of the tack to the depth of the after leech, and halve them for a medium depth: add the number of cloths in the head and foot together, and halve them, to reduce them ſquare; then multiply the number of ſquared cloths by the medium depth; and add to that the additional canvas contained in the foot-gores, linings, bands, and pieces.

LOWER STUDDING-SAILS, SPRIT-COURSES, CROSS-JACK, AND OTHER SQUARE-SAILS.

Multiply the number of cloths by the depth of the ſail, and add the additional canvas contained in the foot-gores, linings, bands, and pieces.

DRIVER SAILS, BOOMSAILS, SETTEE, LUG, AND SPRITSAILS, GAFF-TOPSAILS, AND RING-TAIL-SAILS.

Add the depth of the fore and after leech together, and halve them for a medium depth; add the cloths in the head and foot of the ſail together, and halve them to reduce them ſquare. Then multiply the number of ſquared cloths by the medium depth, and add the additional canvas contained in the foot-gores, linings, bands, and pieces.

RULES FOR FINDING THE QUANTITY OF CANVAS IN THE DIFFERENT GORES.

HOLLOW FOOT-GORES OF MAIN AND FORE COURSES, &c.

Add the ſeveral gores together, and multiply by half the number of cloths that are gored, then divide by 36, the number of inches in a yard.

FOOT-GORES OF MIZEN-COURSES.

The number of cloths in the ſail muſt be multiplied by the additional length that the ſquare cloth in the middle is more than thoſe at the tack and clue; then, the gores to the tack and clue being ſubtracted, the remainder is the anſwer.

GORES OF TRIANGULAR SAILS, STAYSAILS, &c.

The depth of the gores on the ſtay of triangular ſails is found by dividing the depth of the leech by the number of cloths. The gores of quadrilateral ſtayſails, or thoſe with a bunt, are found by ſubtracting the depth of the bunt from the depth of the leech, and dividing the remainder by the number of cloths in the ſail.

FOOT-GORES OF DRIVERS AND OTHER BOOMSAILS.

The gores from where they begin to the maſt-leech muſt be added together, and multiplied by half the number of cloths in the foot; then, the clue-gores being ſubtracted, the remainder is the anſwer, as nearly as can be found by any rule in uſe.

IN deſcribing each ſail ſeparately, the neceſſity of many repetitions is obviated by the reader's referring to the preceding general inſtructions for the different operations; and, though the engravings of the ſails are in general for a twenty gun-ſhip, they will, with the directions, be found to anſwer for all claſſes of ſhips in the Royal-Navy and Merchant-ſervice.

MAIN-COURSE.

This ſail is quadrilateral, ſquare on the head, and made of canvas No. 1 or 2. It bends at the head to the main-yard, which hangs to the maſt at right-angles with the ſhip's length, and parallel to the deck. This ſail extends within 18 inches of the cleats on the yard-arms, and drops to clear the foot from the boat upon the booms.

One cloth is gored on each leech; and the gore on the foot is of one inch per cloth, beginning at two cloths within the neareſt buntline cringle, and increaſing to the clues. Sometimes, in the merchant-ſervice, two cloths are gored on the leeches, and the gore on the foot is 2 inches per cloth.

This ſail has two reef-bands, of one-third the breadth of a cloth: the upper reef-band is at one-ſixth of the depth of the ſail from the head, and the lower reef-band is at the ſame diſtance from the upper one. It has alſo a middle-band, of one breadth of cloth, half-way between the lower reef-band and the foot, and linings of one breadth of cloth from the clue to the earing on the leeches; likewiſe four buntline-cloths, at equal diſtances aſunder, extending from the foot to the middle-band.

A middle-band is ſeldom uſed, in the merchant ſervice, and the buntline-cloths run up one quarter of the depth of the ſail: when uſed, they are generally put on when the ſail is half worn.

Two reef-cringles are made on each leech, one at each reef-band; three bowline-cringles are made at equal diſtances between the lower reef-cringle and the clue; and buntline cringles are made on the foot, one at the end of each buntline cloth.

In ſewing on the bolt-rope, two inches ſlack are taken up in every cloth, in the head and foot, and one inch and a half in every yard in the leeches.

The marling-holes extend from the clue to the lower bowline cringle on the leech, and to the firſt buntline cringle at the foot: The clue is wormed with ¾ of an inch ratline, parcelled with old canvas, well tarred, and ſerved with ſpunyarn, it is then marled to the ſail with marline or houſe-line, and ſeized with ſeveral turns of inch-line, ſtrained tight with three croſs-turns.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add the number of cloths in the head and foot, and halve the product, to make it ſquare; then multiply by the depth, and add the quantity in the gores, linings, bands, and pieces.

To find the quantity in the foot gores, add together the number of inches gored on each cloth on one ſide of the ſail, and multiply the product by the number of gored cloths.

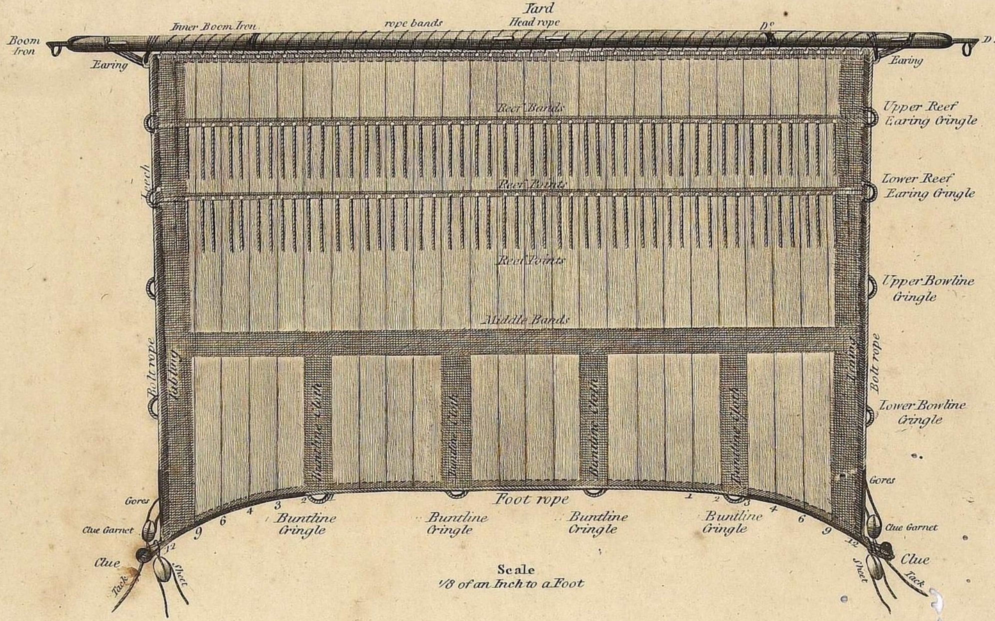
EXAMPLES.

	29	cloths in the head.
	31	cloths in the foot.
½)	60	
	30	ſquare cloths.
	10	yards deep.
	300	yards in the ſail.
	11¼	- - - - - -foot gores.
	22	- - - - - -leech linings.
	13	- - - - - -buntline cloths.
	11¾	- - - - - -reef bands.
	18	- - - - - -middle band.
Total	376	yards for a ſhip of 20 guns.

No. of gored cloths on one ſide of the ſail.

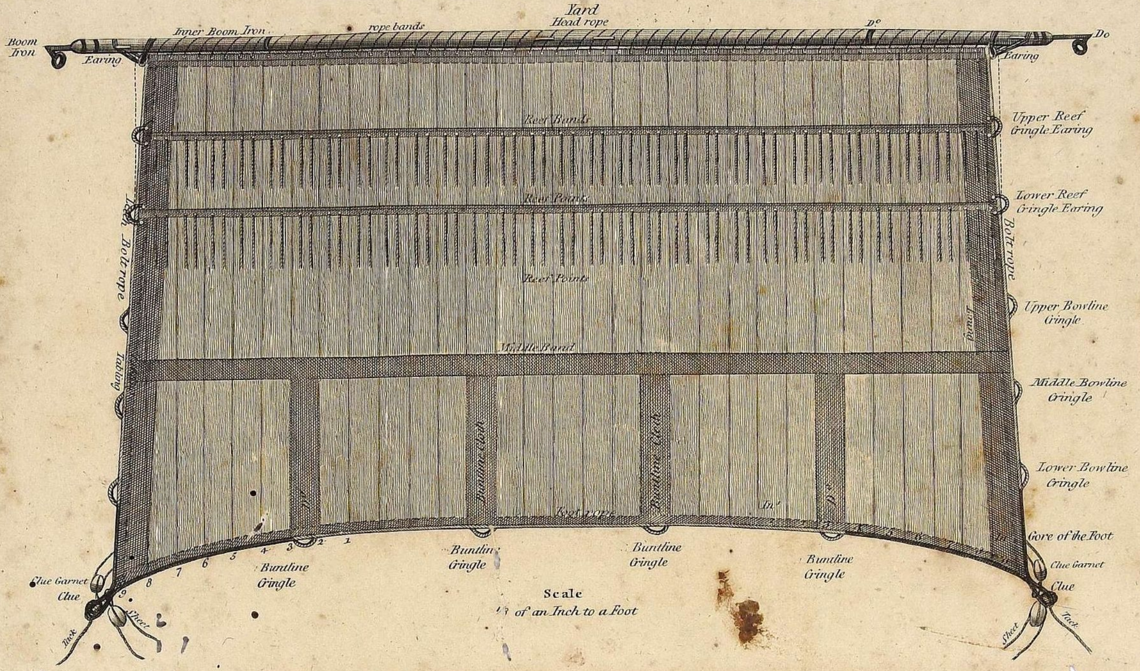
1	No. of inches in the gore on each cloth.
2	
3	
4	
5	
6	
7	
8	
9	
45	inches.
9	gored cloths.
405	inches, or 11 yards & ¼ in the foot gores.

A 20 Gunship's Fore Course.



Pub.d as the Act directs Feb.y 14.th 1793 for D. Steel Bookseller Tower Hill.
J. Cooke. sc.

A 20 Gunship's Main Course.



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FORE-COURSE.

This ſail is quadrilateral, ſquare on the head, and made of canvas No. 1 or 2. It is bent, at the head, to the fore-yard, which hangs to the fore-maſt at right angles with the ſhip's length, and parallel to the deck. This ſail extends within 18 inches of the cleats on the yard-arms, and drops to the main-ſtay at the foot.

One cloth is gored on each leech, and a gore is made on the foot, to drop the clue, 5 to 6 inches per cloth, beginning at two cloths within the neareſt buntline-cringle to the clues. Sometimes, two cloths are gored on each leech, in the merchant-ſervice.

Two reef-bands, of one-third the breadth of a cloth, are put on at one-ſixth of the depth of the ſail aſunder, the upper one being at that diſtance from the head: a middle-band, of one breadth of cloth, is put on half way between the lower reef-band and the foot: the linings on the leeches are of one breadth of cloth, and extend from the clue to the earing: and four buntline-cloths, at equal diſtances aſunder, on the foot, are carried up to the middle-band. In the merchant-ſervice, middle bands are ſeldom uſed, and the buntline-cloths run up one quarter of the depth of the ſail.

Marling-holes are made in the tabling from the clue to the neareſt buntline-cringle on the foot, and one-eighth of the depth of the ſail up the leech. They are turned on the contrary ſide to the roping, in fixing the ſail.

Two reef-cringles are made on the leeches, one at the end of each reef-band; as alſo are two bowline-cringles, the upper bowline-cringle is made in the middle of the leech, and the lower one equally diſtant from the upper one and the clue: a buntline-cringle is alſo made at the end of each buntline-cloth on the foot. The ends of the buntline-cringles next the clues ſhould be left long enough to be worked under the ſervice and meet the ends of the clue-rope.

In ſewing on the bolt-rope, two inches of ſlack-cloth ſhould be taken up in every cloth, in the head and foot, and one inch and a half in every yard in the leeches.

The clue is wormed with ſpunyarn, parcelled with ſlips of tarred canvas; ſerved with 3 or 4 yarn ſpunyarn, marled on with marline or houſe-line, and ſeized with ſeveral turns of inch-line, ſtrained tight with three croſs-turns.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add the number of cloths in the head and foot, and halve the product to make it ſquare, then multiply by the depth, and add the quantity in the gores, linings, bands, and pieces.

To find the quantity in the foot-gores. Add together the number of inches gored on each cloth on one ſide of the ſail, and multiply the product by the number of gored cloths.

EXAMPLES.

	26	cloths in the head.
	25	cloths in the foot.
	½) 51	
	25½	ſquare cloths.
	9	yards deep.
	229½	yards in the ſail.
	7¼	- - - - - - foot-gores.
	20	- - - - - - leech-linings.
	12	- - - - - - buntline-cloths.
	23½	- - - - - - bands.
Total	292¼	yards for a ſhip of 20 guns.

No. of gored cloths in one ſide of the foot.

1	No. of inches in the gore on each cloth.
2	
3	
4	
6	
9	
12	
37	inches.
7	No. of gored cloths.
259	inches, or 7 yards ¼ in the foot gore, nearly.

MIZEN-COURSE.

This ſail is quadrilateral, and made of canvas, No. 2 or 3. The head is bent to the mizen-yard or gaff, and extends within 9 inches of the cleats. The fore-leech is attached to the mizen-maſt within 6 or 7 feet of the deck, ſo that it hangs fore and aft in the plane of the ſhip's keel.

The head is cut with a gore of 16 to 22 inches per cloth, agreeable to the peek: the foot is gored one-inch per cloth, leaving two cloths ſquare in the middle. One cloth on the maſt-leech is ſometimes gored in the navy, and ſometimes two cloths in the merchant-ſervice.

This ſail has a reef-band, 6 or 8 inches broad, at one-fifth of the depth of the maſt-leech from the foot. The after leech is lined from the clue with one breadth of cloth 5 yards in length, and the neck and peek with pieces ſo cut from each other that each contains one yard.

One cringle is made on each leech at the ends of the reef-band; and one at the diſtance of every three-quarters of a yard on the maſt-leech; or ſometimes holes are worked in the tabling of the maſt-leech: a cringle is alſo made 5 yards from the clue on the after leech for the throat-brails.

Two inches of ſlack-cloth in every yard ſhould be taken up in ſewing the bolt-rope on the maſt-leech, but none in the foot or after-leech. The marling-holes extend two feet each way from the clue; the clue is ſeized with three-quarter line, and is left 9 inches long from the ſeizing.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add the depth of the fore and after-leech, and halve the product for a medium depth; multiply the medium depth by the number of cloths, and add the quantity of canvas in the foot-gores, pieces, and reef-band.

To find the quantity in the foot-gores. Multiply the number of cloths by the depth the ſquare cloths in the middle are more than thoſe at the tack; from the product ſubtract the gores from the ſquare cloths to the tack and clue.

EXAMPLE.

$13\frac{1}{2}$ yards, depth of the after-leech.
8 yards, depth of the maſt-leech.

$\frac{1}{2}$) $21\frac{1}{2}$

$10\frac{3}{4}$ medium depth.
10 number of cloths.

$107\frac{1}{2}$ yards in the ſail.
2 - - - - - - -reef-band.
7 - - - - - - -pieces.
$2\frac{1}{4}$ - - - - - - -foot-gores.

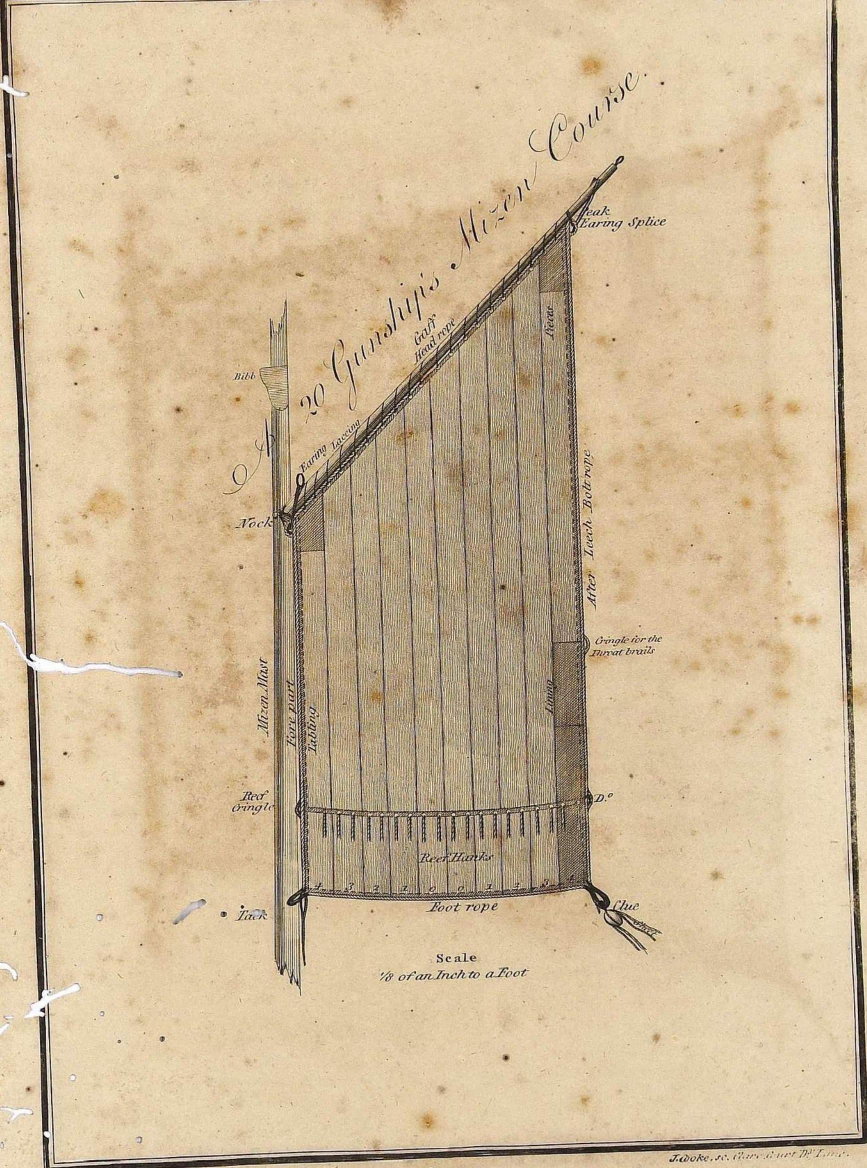
Total $118\frac{3}{4}$ yards, for a ſhip of 20 guns.

Example for the gores.
10 number of cloths.

10 inches. Depth of the ſquare cloths below the depth at the tack.

100
20 inches. Gores from the tack and clue.

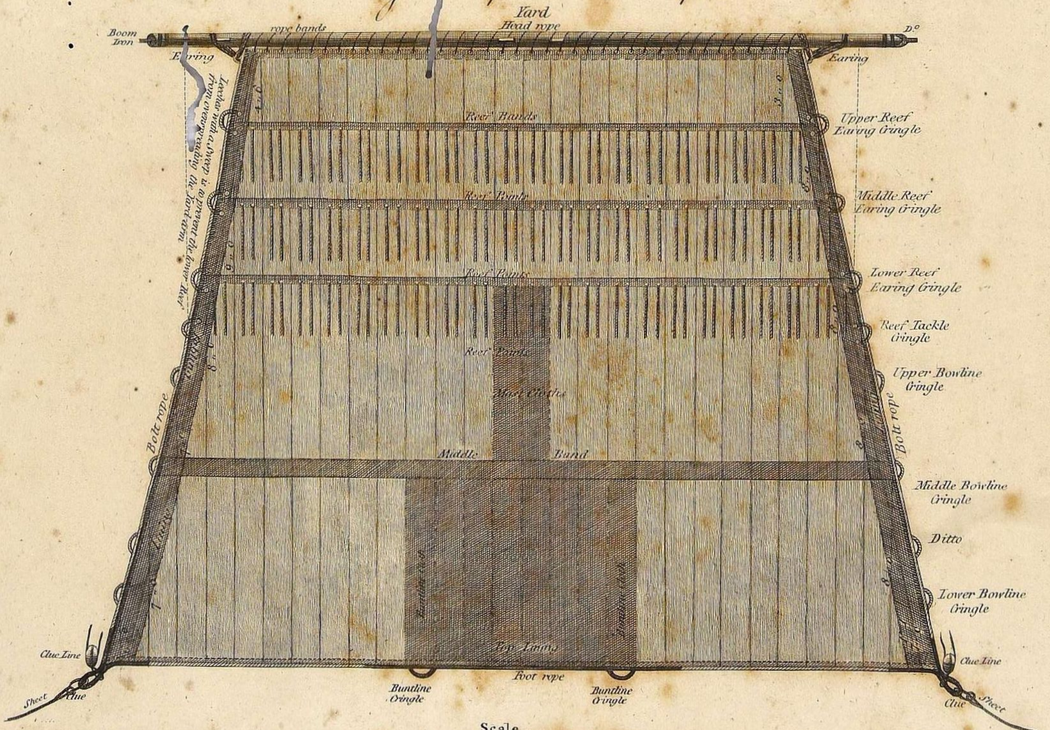
80 inches or 2 yards $\frac{1}{4}$ nearly.



J. Cooke, sc. Clare Court Dy. Lane.

Pub.d as the Act directs Feb.y 24th 1793 for D. Steel Bookseller Tower Hill.

A 20 Gunship's Main Topsail.



Scale
1/8 of an Inch to a foot

Pubd. as the Act directs Feby. 24th 1798 for D. Steel Bookseller Tower Hill.
J. Cooke sc. Clare Court, Dy. Lane

MAIN-TOPSAIL.

This ſail is quadrilateral, ſquare on the head and foot, in the navy, and made of canvas, No. 2 or 3: it is bent at the head to the main-topſail yard, which hangs to the main top-maſt at right angles with the ſhip's length, and parallel to the main-yard: the ſail extends within 18 inches of the cleats on the yard-arms, and drops to the main-yard, when its own yard is hoiſted to the hounds.

The cloths on the leeches are gored ſufficiently for the foot to ſpread the cleats on the main-yard.

This ſail has three or four reef-bands, put on at one-eighth of the depth of the ſail aſunder, the upper one being at that diſtance from the head. A middle-band is put on half-way between the lower reef-band and the foot; and the leeches are lined from clue to earing with one cloth, ſo cut, as, when put on, to be half a cloth broad at the head, and a cloth and a half broad at the foot. This ſail has alſo a top-lining on the aft-ſide, of canvas, No. 6 or 7, which covers one-fifth of the cloths in the foot.

Two maſt-cloths are put on in the middle of the ſail, on the aft-ſide, between the middle-band, and lower reef band, and buntline-cloths are put on the fore-ſide of the ſail, one on each ſide of the top-lining, which have the ends carried up under the middle-band.

One reef-cringle is made on the leeches at the end of each reef-band, and a reef-tackle-pendent-cringle between the lower reef and upper bowline-cringles: below theſe are four bowline-cringles; the upper one is on the middle of the leech, and the other three are equally diſtant from each other between the upper one and the clue. One buntline-cringle is made in the middle of each bunt-line cloth at the foot.

Three inches of ſlack-cloth are taken up in ſewing on the bolt-rope in every cloth in the head and foot; 2 inches are allowed for every cloth left open in the top-brim; and one inch and a half is taken up in every yard in the leeches.

The bolt-rope againſt the top-brim is wormed, parcelled, &c. as the clues, and is marled to the ſail. The marling-holes extend 3 feet each way from the clue, and along the breadth of the top-lining at the top-brim.

In the merchant-ſervice, the foot is gored from 2 to 4 inches per cloth, one-third of the breadth of the foot from the clues; the leech-linings are but 9 inches broad at the head, and 15 inches broad at the foot; the toplining and buntline-cloths cover one third of the cloths in the foot, and are carried up one-third of the depth of the ſail; the buntline-cloths are half a yard ſhorter than the toplining; and the leeches have only three bowline-cringles.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add the number of cloths in the head and foot, and halve the product to make it ſquare; then multiply by the depth, and add the quantity in the linings and bands.

EXAMPLE.

	$19\frac{1}{2}$	cloths in the head.
	30	cloths in the foot.
$\frac{1}{2}$)	$49\frac{1}{2}$	
	$24\frac{3}{4}$	ſquare cloths.
	$13\frac{1}{4}$	yards deep.
	$327\frac{3}{4}$	yards in the ſail.
	28	- - - - - - -leech-linings.
	$32\frac{3}{4}$	- - - - - - -top linings and maſt-cloths.
	$8\frac{3}{4}$	- - - - - - -buntline-cloths.
	$34\frac{1}{2}$	- - - - - - -reef and middle-bands.
Total	$431\frac{3}{4}$	yards for a ſhip of 20 guns.

FORE-TOPSAIL.

This ſail is quadrilateral, ſquare on the head and foot in the royal navy, and made of canvas No. 2 or 3. The head is bent to the fore-topſail-yard, and it hangs to the main-maſt at right-angles with the ſhip's length, and parallel to the fore-yard, extending, at the head, within 18 inches of the cleats on the yard-arms.

The cloths on each leech are gored ſufficiently for the foot to ſpread the length of the fore-yard. Sometimes, in the merchant-ſervice the foot is gored 2 to 4 inches per cloth, from one-third of the breadth of the foot to the clues.

One reef-cringle is made at the end of each reef-band, and a reef-pendent-cringle between the lower reef and upper bowline-cringles. The reef and reef-pendent-cringles are ſtuck through holes made in the tabling; and beneath them are made three bowline-cringles; the upper one upon the middle of the leech, and the others equally aſunder between that and the clue: two buntline-cringles are alſo made in the middle of each buntline-cloth on the foot.

The linings, cloths, bands, clues, &c. are the ſame as for the main topſail.

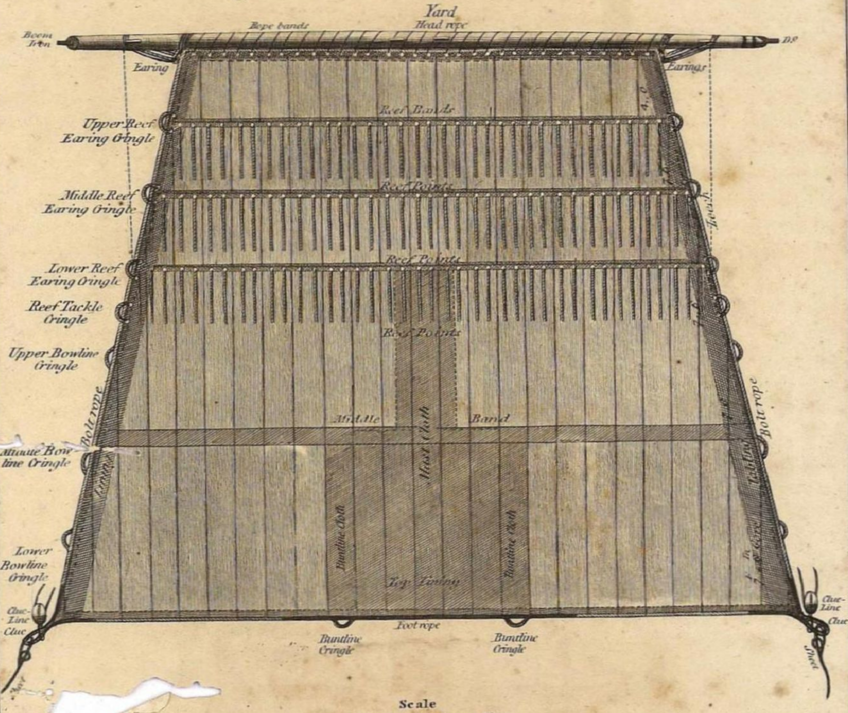
RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add the number of cloths in the head and foot, and halve the product to make it ſquare, then multiply by the depth and add the quantity in the linings, and bands.

EXAMPLE.

	$16\frac{1}{2}$	cloths in the head.
	$26\frac{1}{2}$	cloths in the foot.
	$\frac{1}{2}$) 43	
	$21\frac{1}{2}$	ſquare cloths.
	$11\frac{3}{4}$	yards deep.
	$252\frac{5}{8}$	yards in the ſail.
	$25\frac{1}{4}$	- - - - - - leech-linings.
	$25\frac{1}{4}$	- - - - - - top-lining and maſt-cloths.
	$7\frac{1}{4}$	- - - - - - buntline cloths.
	$28\frac{3}{8}$	- - - - - - reef and middle-bands.
Total	$341\frac{1}{8}$	yards for a 20 gun ſhip.

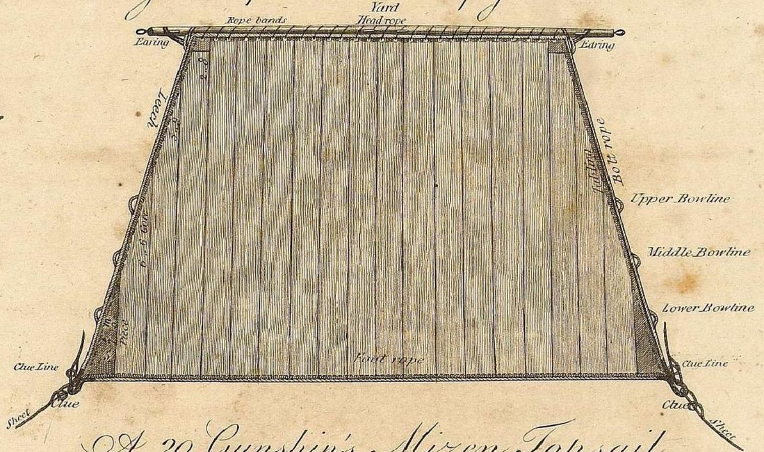
A 20 Gunship's Fore Topsail.



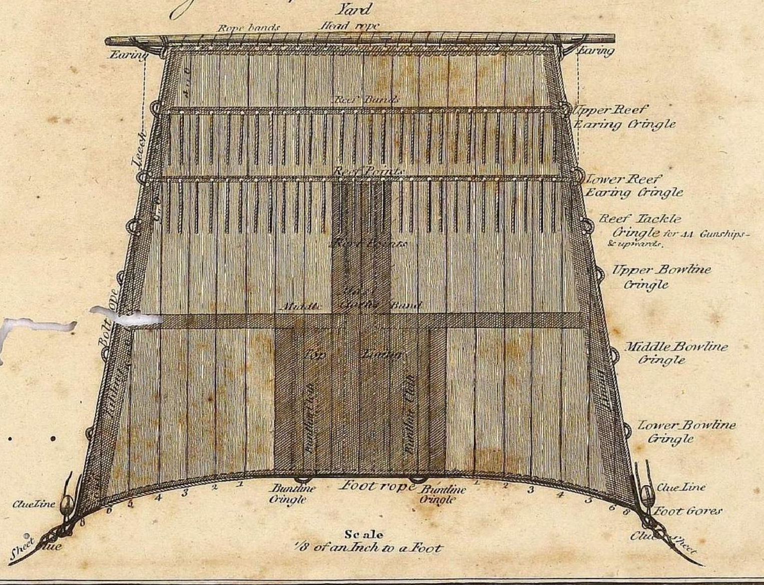
Scale
1/8 of an Inch to a Foot

Pubd. as the Act directs Febry. 14th 1793. for D. Steel Bookseller Tower Hill

A 20 Gunship's Main Topgallant Sail.



A 20 Gunship's Mizen Topsail.



Pub.d as the Act directs Feb.y 14th 1793, for D. Steel Bookseller Tower Hill

MIZEN-TOPSAIL.

This ſail is quadrilateral, ſquare on the head, and made of canvas No. 4, 5, or 6: it is bent at the head to the mizen topſail yard, and hangs to the mizen topmaſt at right angles with the ſhip's length, and parallel to the croſs-jack-yard, extending within 12 inches of the cleats on the yard-arms.

The cloths on the leeches are gored ſufficiently for the foot to ſpread the length of the croſs-jack-yard, and the clues reach the ſheet-blocks on the croſs-jack-yard-arms, when both yards are hoiſted.

The gore on the foot is three quarters of a yard deep, and begins at two cloths from the buntline-cringle, on the ſide next the clues. In the merchant-ſervice, the foot is ſometimes ſquare.

Mizen-topſails, for 50 gun-ſhips and upwards, have three reef-bands at one-eighth of the depth of the ſail aſunder from the head; and, for 44 gun-ſhips and under, two reef-bands, one-ſeventh of the depth of the ſail aſunder; alſo a middle-band, of one breadth of cloth, half-way between the lower reef-band and the foot. In the merchant-ſervice, they have 2 reefs, as the 44 gun-ſhip, but no middle-band.

The leeches are lined with one-breadth of cloth, ſo cut as to be half a cloth broad at the head, and a cloth and a half broad at the foot. In the merchant ſervice, they are lined with part of a cloth, 9 inches broad at the head, and 15 inches at the foot.

The top-lining covers one-fifth of the cloths in the foot: the upper-end is carried as high as the middle-band, and the band is tabled on it. The buntline-cloths join the top-lining, and are carried under the middle-band. In the merchant-ſervice, the top-lining covers one-third of the cloths in the foot, and is carried up one-third of the depth of the ſail, and the buntline-cloths are half a yard ſhorter than the top-lining.

One inch and a half of ſlack-cloth is taken up, in ſewing on the bolt-rope, in every yard in the leeches, three inches in every cloth in the head and foot, and and 2 inches are allowed for every cloth in the top-brim.

One reef-cringle is made on the leeches at the end of each reef-band, and three bowline-cringles are made on each leech, the upper one in the middle of the leech, and the others equally diſtant between that and the clue. Forty-four gun ſhips and upwards have a reef-pendent-cringle between the lower reef and upper bowline-cringles.

The clue and top-brim are wormed, parcelled, ſerved, and marled as other topſails.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add the number of cloths in the head and foot, and halve the product to make it ſquare, then multiply by the depth of the ſail, and add the quantity in the foot-gores, linings, and bands.

EXAMPLE.

$13\frac{1}{2}$ cloths in the head.
$19\frac{1}{2}$ cloths in the foot.

$\frac{1}{2})33$

$16\frac{1}{2}$ ſquare cloths.
$9\frac{1}{4}$ yards deep.

$152\frac{5}{8}$ yards in the ſail.
$66\frac{1}{4}$ yards in the foot-gores, linings, bands, and pieces.

Total $219\frac{7}{8}$ yards for a ſhip of 20 guns.

MAIN-TOPGALLANT-SAIL.

This ſail is quadrilateral, and ſquare on the head and foot, in the navy, and made of canvas No. 6 or 7: the head is bent to the main-topgallant-yard, which hangs to the main-topgallant-maſt at right angles with the ſhip's length, and parallel to the main-topſail-yard, extending within 6 inches of the cleats on the yard-arms. The clues reach to the main-topſail-yard-arms, when both yards are hoiſted.

The cloths on the leeches are gored ſufficiently for the foot to ſpread the length of the main-topſail-yard. A gore of 2 or 3 inches per cloth is often made on the foot, in the merchant-ſervice, beginning at one-third of the breadth from the clue.

The cloth at the clue is ſo cut as to fall to the foot and form its own lining; and earing-pieces of one quarter of a yard are put on each corner at the head.

Three bowline-cringles are made on each leech, the upper one in the middle, and the others equally aſunder between that and the clue.

FORE-TOPGALLANT-SAIL.

This ſail is quadrilateral, and ſquare on the head and foot, in the navy, and made of canvas No. 6 or 7: the head is bent to the fore-topgallant-yard, which hangs to the fore-topgallant-maſt at right angles to the ſhip's length, and parallel with the fore-topſail-yard, extending within 6 inches of the cleats on the yard-arms: the clues reach to the fore-topſail-yard-arms, when both yards are hoiſted.

The cloths on the leeches are gored ſufficiently for the foot to ſpread the length of the fore-topſail-yard: the cloth at each clue is ſo cut as to fall to the foot and form its own lining, and a piece, of one quarter of a yard, is put on each corner at the head. In the merchant-ſervice, a gore is ſometimes made on the foot, of 2 or 3 inches per cloth, beginning at one-third of the breadth from the clue.

Three bowline-cringles are made on each leech; the upper one in the middle, and the others equally diſtant from that and the clue; as this ſail may be occaſionally uſed for the main-topgallant-ſail. In the merchant-ſervice, it has no cringles.

MIZEN-TOPGALLANT-SAIL.

This ſail is quadrilateral, and ſquare on the head and foot, in the navy, and made of canvas No. 7 or 8. The head is bent to the mizen-topgallant-yard, and it hangs to the mizen-topmaſt at right angles with the ſhip's length, and parallel with the mizen-topſail-yard, extending within 6 inches of the cleats on the yard-arms. The clues reach to the mizen-topſail-yard-arms, when both yards ar[e] hoiſted.

The leeches are gored ſufficiently for the foot to ſpread the length of the mizen topſail-yard, an[d] the pieces on the clues and earings are each a quarter of a yard in length.

RULE TO FIND THE QUANTITY OF CANVAS IN MAIN, FORE, AND MIZEN TOPGALLANT SAILS.

Add the number of cloths in the head and foot, and halve the product to make it ſquare, then multiply by the depth, and add quantity in the pieces.

EXAMPLE FOR THE MAIN-TOPGALLANT-SAIL.

$13\frac{1}{2}$ cloths in the head.
20 cloths in the foot.

$\frac{1}{2}$) $33\frac{1}{2}$

$16\frac{3}{4}$ ſquare cloths.
$6\frac{1}{2}$ yards deep.

$108\frac{7}{8}$ yards in the ſail.
$3\frac{1}{2}$ foot gores.
$2\frac{5}{8}$ pieces,

115 yards for a 20 gun ſhip.

EXAMPLE FOR THE FORE-TOPGALLANT-SAIL.

$11\frac{1}{2}$ cloths in the head.
$17\frac{1}{2}$ cloths in the foot.

$\frac{1}{2}$) 29

$14\frac{1}{2}$ ſquare cloths.
$5\frac{3}{4}$ yards deep.

$83\frac{3}{4}$ yards in the ſail.
$1\frac{1}{2}$ pieces.

$84\frac{3}{4}$ yards for a 20 gun ſhip.

EXAMPLE FOR THE MIZEN-T[OPGALLANT]-SAIL.

$9\frac{1}{2}$ cloths in the head.
14 cloths in the foot.

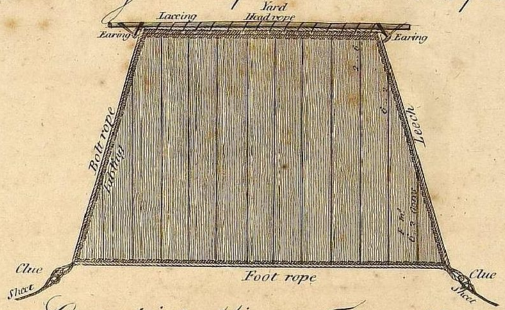
$\frac{1}{2}$) $23\frac{1}{2}$

$11\frac{3}{4}$ ſquare cloths.
5 yards deep.

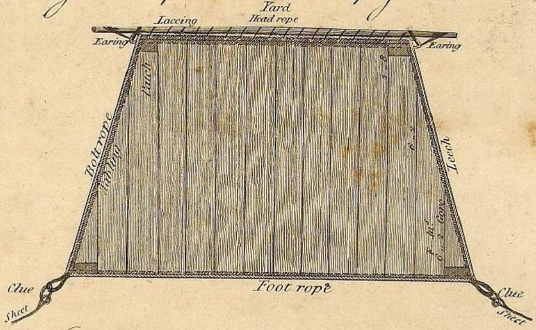
$58\frac{3}{4}$ yards in the ſail.
1 pieces.

$59\frac{3}{4}$ yards for a 20 gun ſhip.

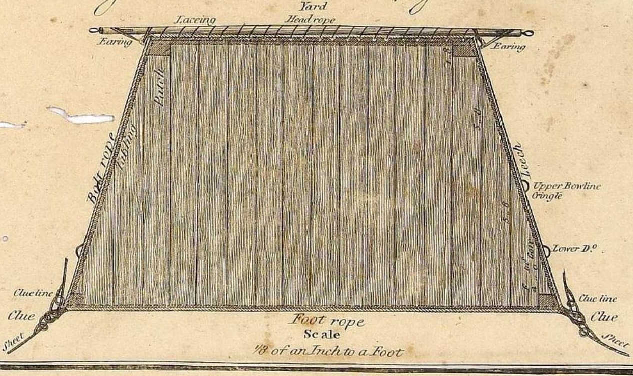
A 20 Gunship's Main Royal.



A 20 Gunship's Mizen Topgallant Sail.



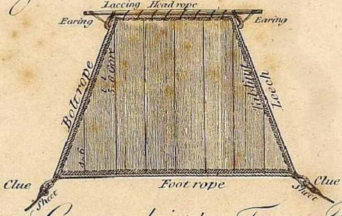
A 20 Gunship's Fore Topgallant Sail.



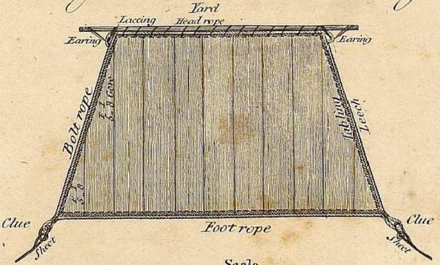
Scale
1/8 of an Inch to a Foot

Pub.d as the Act directs Feb.y 14th 1793 for D. Steel Bookseller, Tower Hill.

A 20-Gunship's Mizen Royal.

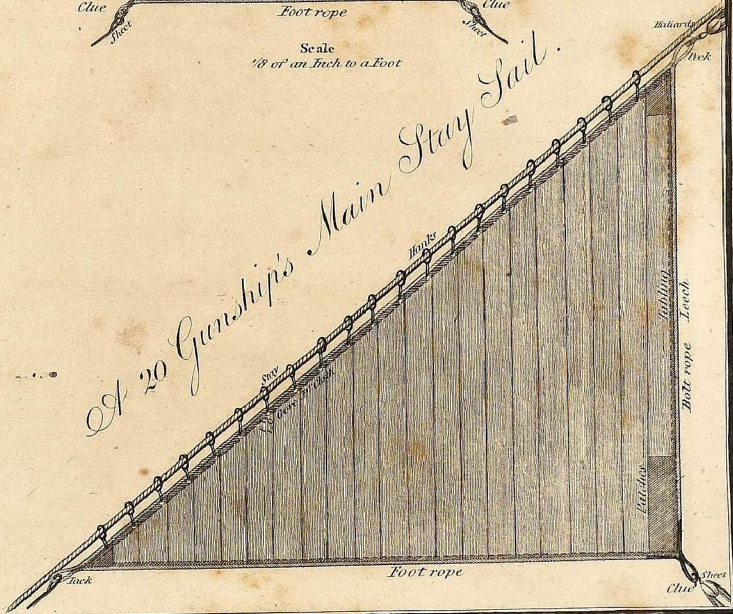


A 20 Gunship's Fore Royal.



Scale
1/8 of an Inch to a Foot

A 20 Gunship's Main Stay Sail.



Pub.d as the Act directs. Feb.y 24th 1793 for D. Steel, Bookseller, Tower Hill.

MAIN-ROYAL-SAIL.

This ſail is quadrilateral, ſquare on the head and foot, and made of canvas No. 8: the head is bent to the main-royal-yard, which hangs to the main-topgallant-maſt-head at right angles with the ſhip's length, and parallel with the main-topgallant-yard, extending within 4 inches of the cleats on the yard-arms.

The cloths on the leeches are gored ſufficiently for the foot to ſpread the length of the main-topgallant-yard, and the clues reach to the main-topgallant-yard-arms, when both yards are hoiſted.

FORE-ROYAL-SAIL.

This ſail is quadrilateral, ſquare on the head and foot, and made of canvas No. 8: the head is bent to the fore-royal-yard, which hangs to the fore-topgallant-maſt-head at right angles with the ſhip's length, and parallel with the fore-topgallant-yard, extending within 4 inches of the cleats on the yard-arms.

The cloths are gored on the leeches ſufficiently for the foot to ſpread the length of the fore-topgallant-yard, and it drops for the clues to reach the fore-topgallant-yard-arms, when both yards are hoiſted.

MIZEN-ROYAL-SAIL.

This ſail is quadrilateral, ſquare on the head and foot, and made of canvas No. 8: the head is bent to the mizen-royal-yard, which hangs to the head of the mizen-topmaſt or top-gallant-maſt, at right angles with the ſhip's length, and parallel with the mizen-top-gallant-yard, extending within 4 inches of the cleats on the yard-arms.

The cloths are gored on each leech ſufficiently for the foot to ſpread the mizen-topgallant-yard, and the clues reach to the mizen topgallant-yard-arms when both yards are hoiſted.

*** This ſail is ſeldom uſed.

RULE FOR FINDING THE QUANTITY OF CANVAS IN MAIN, FORE, AND MIZEN-ROYAL SAILS.

Add the number of cloths in the head and foot, and halve the product to make it ſquare, then multiply by the depth of the ſail.

EXAMPLE FOR THE MAIN ROYAL SAIL.

8 cloths in the head.
13 cloths in the foot.

$\frac{1}{2}$) 21

$10\frac{1}{2}$ ſquare cloths.
$4\frac{1}{2}$ yards deep.

$47\frac{1}{4}$ yards for a 20 gun ſhip.

EXAMPLE FOR THE FORE ROYAL SAIL.

7 cloths in the head.
11 cloths in the foot.

$\frac{1}{2}$) 18

9 ſquare cloths,
$3\frac{3}{4}$ yards deep.

$33\frac{3}{4}$ yards for a 20 gun ſhip.

EXAMPLE FOR THE MIZEN ROYAL SAIL.

4 cloths in the head.
8 cloths in the foot.

$\frac{1}{2}$) 12

6 ſquare cloths.
$3\frac{1}{4}$ yards deep.

$19\frac{1}{2}$ yards for a 20 gun ſhip.

MAIN STAYSAIL.

This ſail is triangular, ſquare on the foot in the royal-navy, and made of canvas No. 1 to 3. It is extended upon the main-ſtayſail-ſtay, between the main and fore maſts, ſo that the foot will clear the boat upon the booms.

*** This ſail is ſeldom uſed in large veſſels.

A regular gore is made on the ſtay of 17 to 19 inches per cloth. The cloth at the tack is ſo cut as to fall to the foot and form its own lining. The clue-piece extends two yards up the leech, and the peek-piece is one yard in length.

Holes are made on the ſtay 27 inches aſunder, and marling-holes are made 2 feet each way from the clue. In ſewing on the bolt-rope, 3 inches ſlack ſhould be taken up in every yard in the ſtay, and one inch in every cloth in the foot, but none in the leech.

Iron thimbles are ſometimes ſtuck at the tack and peek, but when none, the tack and peek are the ſame as the clue.

In the merchant-ſervice, this ſail is frequently cut with a bunt, and a gore is ſometimes made on the foot, with a ſweep. It alſo frequently has a reef-band at about 4 feet from the foot, and ſometimes a bonnet.

FORE STAYSAIL.

This ſail is triangular, ſquare on the foot, and made of canvas No. 1 to 3. It is extended on the fore-ſtay between the fore-maſt and bowſprit.

A regular gore is made on the ſtay of 21 to 23 inches per cloth. The cloth at the tack is ſo cut as to fall to the foot, and form its own lining; the clue-piece extends two yards up the leech, and the peek-piece is half a yard in length.

The holes on the ſtay are 27 inches aſunder, and the marling-holes extend 2 feet each way from the clue. Three inches ſlack ſhould be taken up in every yard in the ſtay when ſewing on the bolt-rope; and one inch in every cloth in the foot. The tack and peek are ſometimes fixed on, or are marled, as the clue.

Thimbles are ſometimes ſtuck at the tack and peek, but when none, the tack and peek are the ſame as the clue.

RULE FOR FINDING THE QUANTITY OF CANVAS IN MAIN AND FORE STAYSAILS.

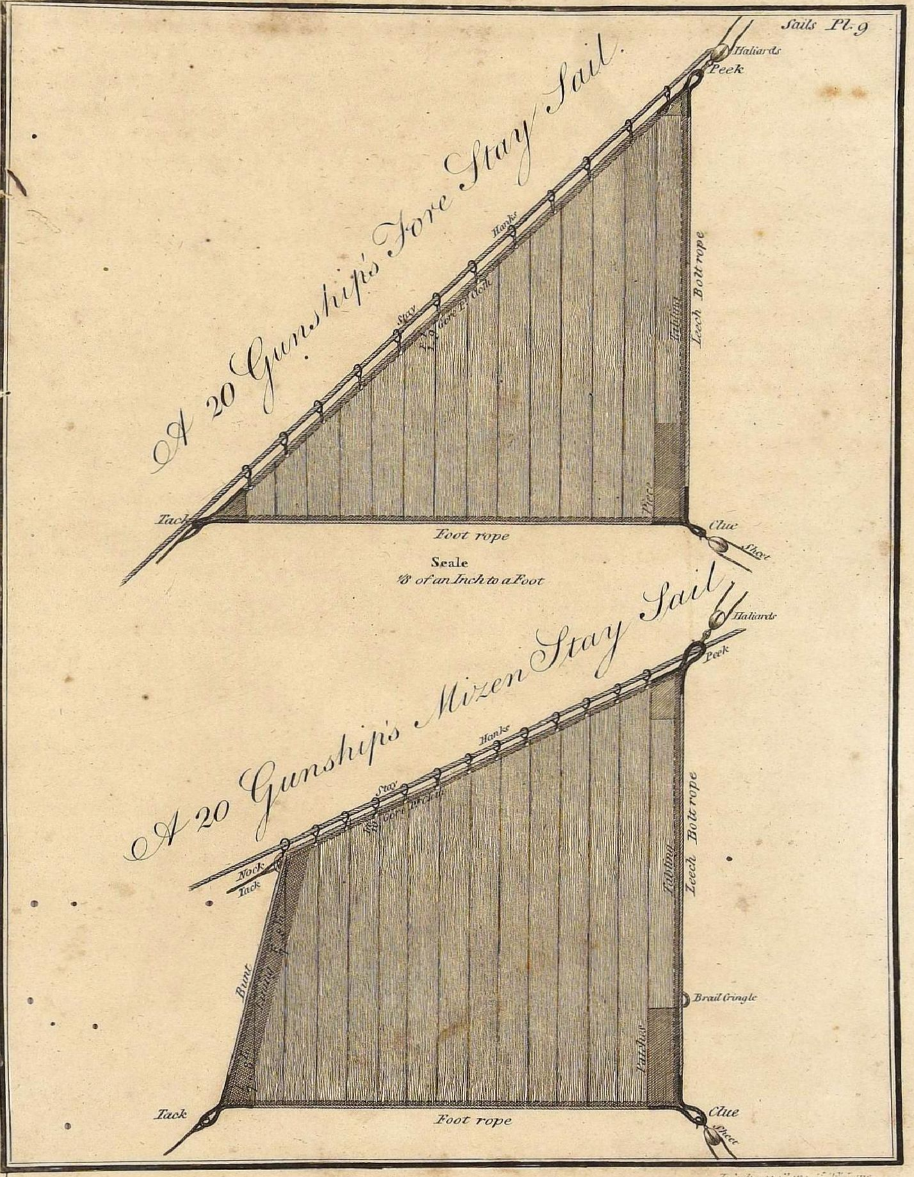
Multiply half the number of cloths by the depth of the leech, and add the quantity in the pieces.

EXAMPLE FOR THE MAIN-STAYSAIL.

	11	half the number of cloths.
	10	yards; depth the leech.
	110	yards in the ſail.
	4	- - - - - - pieces.
Total	114	yards for a 20 gun ſhip.

EXAMPLE FOR THE FORE-STAYSAIL.

$7\frac{1}{2}$	half the number of cloths.
9	yards; depth of the leech.
$67\frac{1}{2}$	yards in the ſail.
3	- - - - - - pieces.
$70\frac{1}{2}$	yards for a 20 gun ſhip.



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MIZEN STAYSAIL.

This ſail is quadrilateral, ſquare on the foot, and made of canvas No. 2 or 3: it has a bunt three-fifths of the depth of the leech in the navy, and one-third or one-fourth of the depth of the leech in the merchant-ſervice; and it is extended on the mizen-ſtay between the main and mizen maſts. The foot drops within 6 or 7 feet of the quarter-deck.

Two cloths are generally gored on the bunt, and the ſtay from 10 to 12 inches per cloth. If the depth of the bunt be ſubtracted from the depth of the leech, the remainder, divided by the number of gored cloths, gives the depth of each gore on the ſtay.

The bunt or fore-part is lined with half a breadth of cloth; the clue-piece is two yards long, and the peek-piece one yard. In the merchant-ſervice the tack, peek, and nock pieces are generally but three-quarters of a yard in length.

Holes are made in the ſtay, three-quarters of a yard aſunder, and marling-holes two feet each way from the clue. Three inches of ſlack cloth ſhould be taken in with the rope in every yard in the ſtay, and one inch in every cloth in the foot, but none in the leech.

Thimbles are ſometimes ſtuck at the tack and peek; but, when thimbles are not uſed, the tack and peek are frequently marled as the clue.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add the depth of the bunt to the depth of the leech, and halve the ſame for a medium depth; add the cloths in the head and foot, and halve the product to make it ſquare; then multiply the number of ſquare cloths by the medium depth, and add the quantity in the lining and pieces.

EXAMPLE.

	9	yards; depth of the leech.
	5	- - - - - - - - - - - bunt.
	$\frac{1}{2}$) 14	
	7	medium depth.
	14	number of ſquared cloths.
	98	yards in the ſail.
	$5\frac{1}{2}$	- - - - - - bunt-lining.
	3	- - - - - - pieces.
Total	$106\frac{1}{2}$	yards for a ſhip of 20 guns.

Q

MAIN TOPMAST STAYSAIL.

This ſail is quadrilateral, cut ſquare on the foot, and made of canvas No. 5, or 6. It is extended on the main-topmaſt preventer-ſtay, between the main and fore topmaſts. The leech is 4 or 5 yards deeper than the main-topſail, and there are one or two cloths more in the foot than the leech is yards in depth.

In large merchant-ſhips, the leech is 4 or 5 yards deeper than the main-topſail, but, in ſmaller ſhips, only 1 or 2 yards; and there are from 1 to 3 cloths more in the foot than the leech is yards in depth.

The bunt is two-fifths of the depth of the leech: but in the merchant-ſervice it is from two-fifths to one-half of the depth.

Two cloths are generally gored on the bunt, and the ſtay is gored 22 inches per cloth. If the depth at the nock-ſeam be ſubtracted from the depth of the leech, the remainder, divided by the number of gored cloths, gives the depth of each gore on the ſtay.

The bunt is lined with half a breadth of cloth. The clue-piece is two yards long, and the peek-piece one yard. In the merchant-ſervice this ſail generally has tack, nock, and peek pieces, each, three quarters of a yard in length.

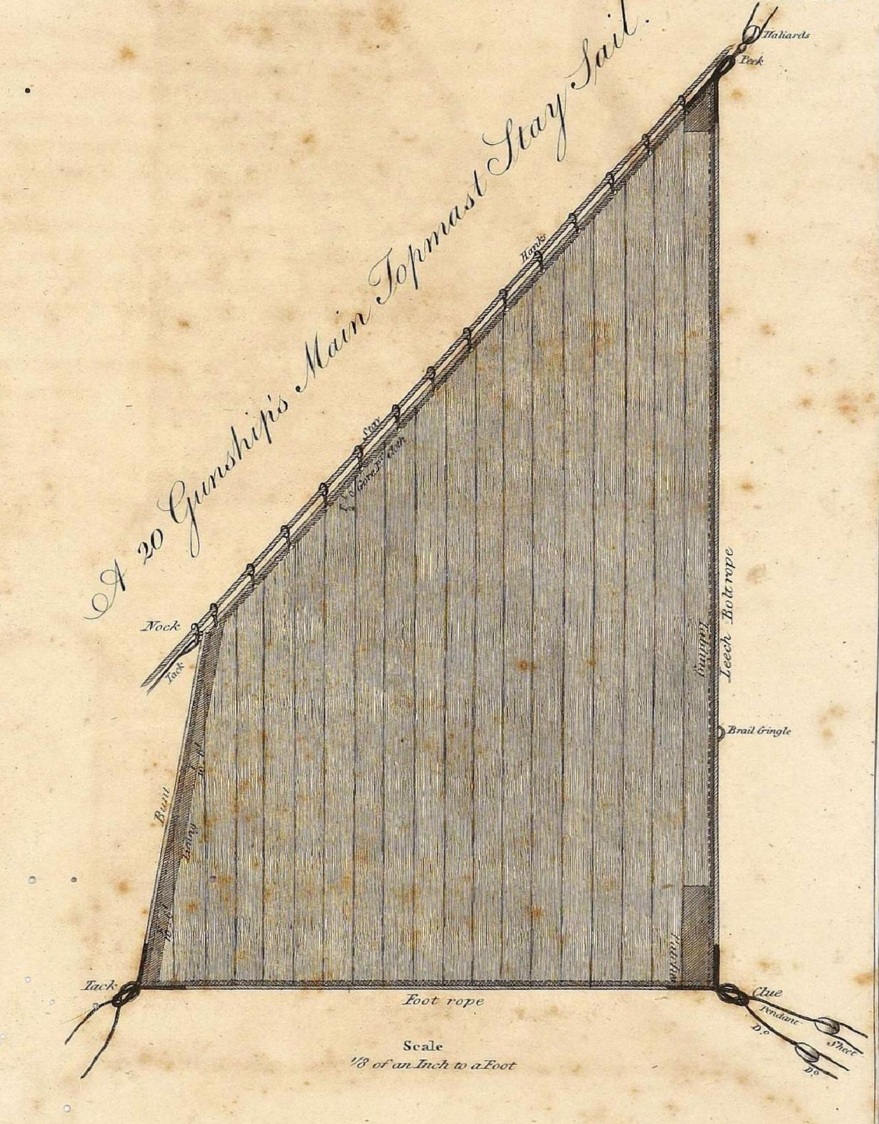
The holes on the ſtay are 27 inches aſunder, and marling-holes are made two feet each way from the clue. Three inches of ſlack-cloth ſhould be taken up in every yard in the ſtay, and one inch in every cloth in the foot, but none in the leech. Thimbles are ſometimes ſtuck in the tack and peek: when there are none, the tack and peek are the ſame as the clue, and are fixed or marled on.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add the depth of the bunt to the depth of the leech, and halve the product for a medium: add the number of cloths in the foot and upper part together, and halve the product to make it ſquare: then multiply the number of ſquared cloths by the medium depth, and add the quantity in the lining and pieces.

EXAMPLE.

	18	yards; depth of the leech.
	7	yards; depth of the bunt.
$\frac{1}{2}$)	25	
	$12\frac{1}{2}$	medium depth.
	18	half the number of ſquare cloths in the foot and upper part.
	225	yards in the ſail.
	$3\frac{3}{4}$	- - - - - - bunt-lining.
	3	- - - - - - pieces.
Total	$231\frac{3}{4}$	yards for a ſhip of 20 guns.



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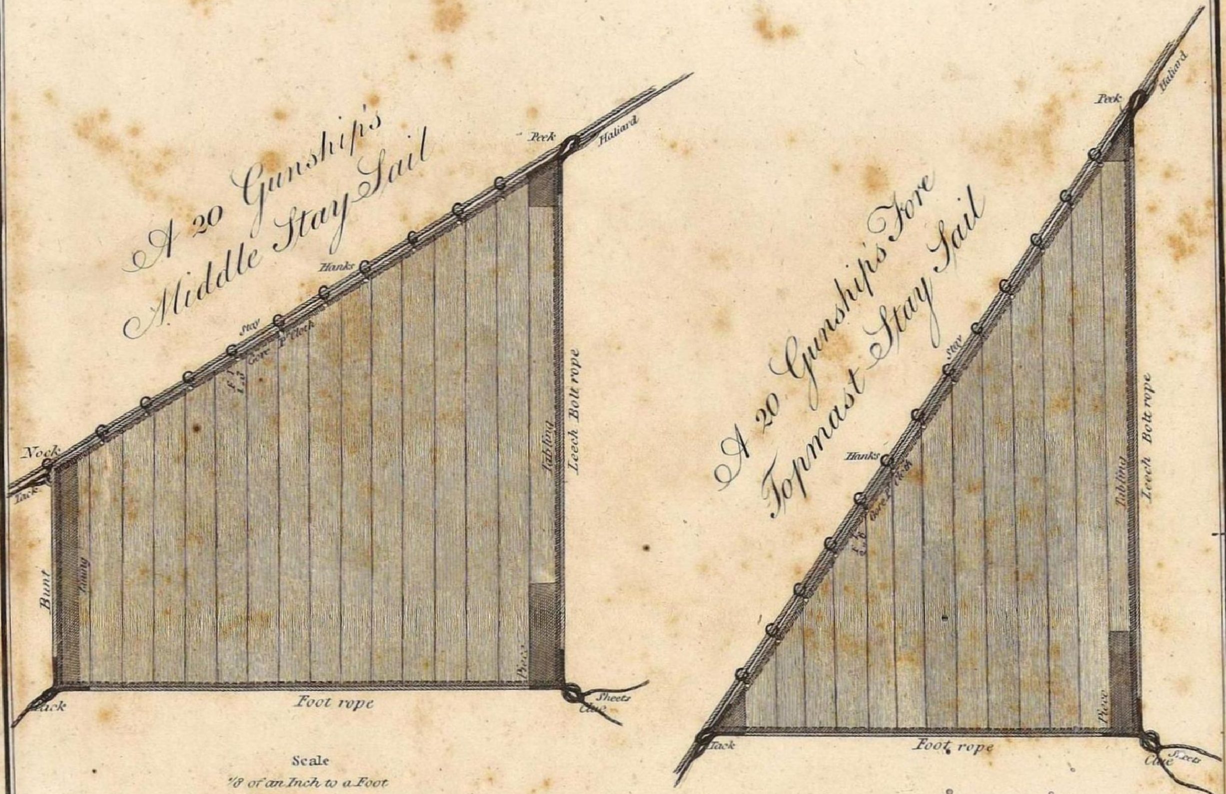

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FORE TOPMAST STAYSAIL.

This ſail is triangular, cut ſquare on the foot, and made of canvas No. 5, 6, or 7. It is extended on the fore-topmaſt-ſtayſail-ſtay, and the foot is ſpread on the bowſprit. The leech is of the ſame depth as the fore-topſail; and 2 or 3 cloths are allowed in the foot for every yard in the depth of the leech. In the merchant-ſervice, one cloth only is allowed in the foot for every yard in the depth of the leech.

The ſtay is gored 30 inches per cloth. The depth of the gore on each cloth in the ſtay is found by dividing the depth of the leech by the number of cloths.

The cloth at the tack is ſo cut as to fall to the foot and form its own lining. The clue-piece is two yards long, and the peek-piece one yard. In the merchant-ſervice, the piece at the clue is in general but one yard in length, and the tack and peek pieces half a yard each.

The holes on the ſtay are 27 inches aſunder, and the marling-holes extend two feet each way from the clue. Three inches ſlack ſhould be taken up, in ſewing on the rope, in every yard in the ſtay, and one inch in every cloth in the foot.

Thimbles are ſometimes ſtuck at the tack and peek: when there are none, the tack and peek are the ſame as the clue, and are fixed or marled on. The clue is ſeized with ſmall line.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Multiply half the number of cloths in the foot by the depth of the leech, and add the quantity in the pieces.

EXAMPLE.

	7	half the number of cloths.
	12	yards deep.
	84	
	4	yards in the pieces.
Total	88	yards for a 20 gun ſhip.

MIDDLE STAYSAIL.

This ſail is quadrilateral, cut ſquare on the foot, and made of canvas No. 6, or 7. It has a ſquare bunt five-twelfths of the depth of the leech, and it is extended on the middle-ſtayſail-ſtay, between the main-topmaſt-ſtay and main-topgallant-ſtay.

The leech is from 4 to 7 yards deeper than the main-topgallant-ſail, and there are from 6 to 8 cloths more in the foot than the leech is yards in depth. Sloops and brigs in the navy have only from one to three cloths more in the foot than yards in the depth of the leech.

In the merchant-ſervice, the leech is ſometimes of the ſame depth as the main-topgallant-ſail, but generally, one, two, or three yards more; and the ſail has from 5 to 10 cloths more in the foot than yards in the depth of the leech.

The ſtay is gored 13 inches and a half per cloth. If the depth of the bunt be ſubtracted from the depth of the leech, the remainder, divided by the number of cloths, gives the depth of each gore on the ſtay.

The bunt is lined with half a breadth of cloth, the clue with a piece two yards long, and the peek with a piece one yard in length. Three inches of ſlack-cloth ſhould be taken up in every yard in the ſtay, when ſewing on the rope, and one inch in every cloth in the foot.

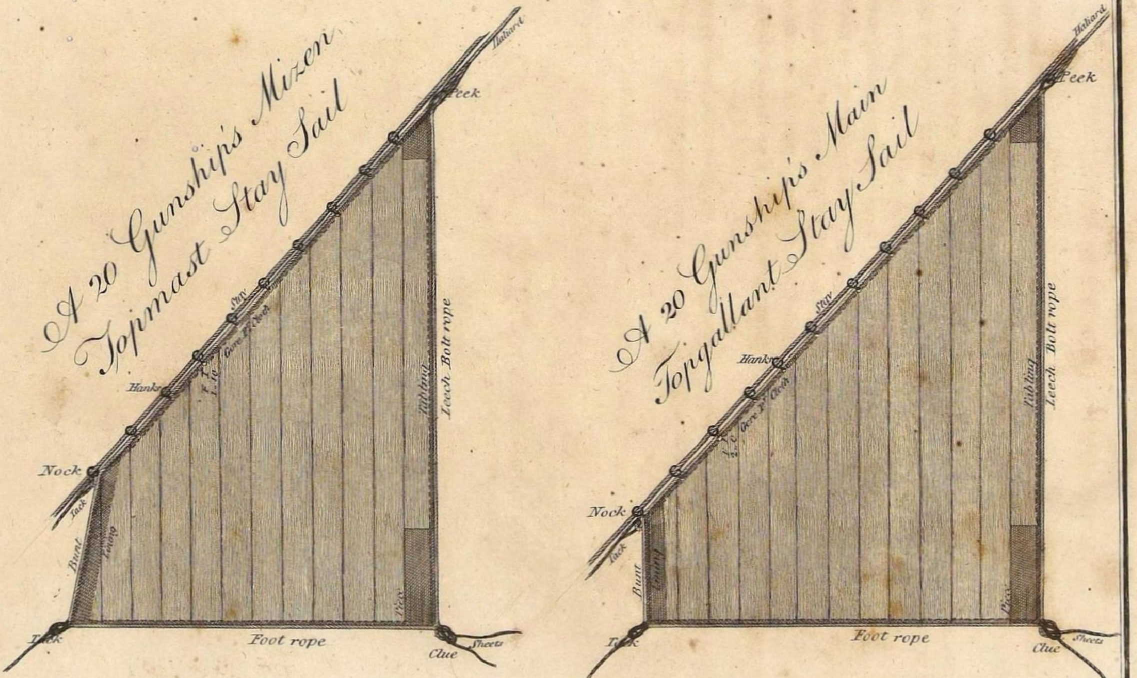
Thimbles are ſometimes ſtuck at the tack and peek: when there are none, the tack and peek are the ſame as the clue, and are marled on.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add the depth of the bunt to the depth of the leech, and halve the ſame for a medium depth; then multiply the medium depth by the number of cloths, and add the quantity in the lining and pieces.

EXAMPLE.

	$10\frac{1}{4}$	yards; depth of the leech.
	$4\frac{1}{4}$	- - - - - - - - - - bunt.
$\frac{1}{2}$)	$14\frac{1}{2}$	
	$7\frac{1}{4}$	medium depth.
	16	number of cloths.
	116	yards in the ſail.
	$5\frac{1}{8}$	yards in the lining and pieces.
Total	$121\frac{1}{8}$	yards for a 20 gun ſhip.



Scale
1/8 of an Inch to a Foot

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MIZEN TOPMAST STAYSAIL.

This ſail is quadrilateral, cut ſquare on the foot, and made of canvas No. 7. It has a bunt three-ſevenths or one-third of the depth of the leech, and is extended on the mizen-topmaſt-ſtay between the main and mizen topmaſts.

The leech is one or two yards deeper than the mizen-topſail, and there are from 2 to 5 cloths more in the foot than the leech is yards in depth.

One cloth is generally gored on the bunt, and the ſtay is gored twenty-four inches per cloth. If the length of the nock-ſeam be ſubtracted from the depth of the leech, the remainder, divided by the number of cloths in the ſtay, gives the depth of each gore.

The bunt is lined with half a breadth of cloth; the clue-piece is 2 yards long, and the peek-piece one yard. In the merchant-ſervice the clue-piece is generally one yard long, and the peek-piece half a yard. Three inches ſlack ſhould be taken up in every yard in the ſtay, and one inch in every cloth in the foot.

Thimbles are generally ſtuck in the tack and peek; but, when no thimbles, the tack and peek are the ſame as the clue.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add together the depth of the bunt and the depth of the leech, and halve the product for a medium: then add the number of cloths in the ſtay and foot, and halve the product to make it ſquare: multiply the number of ſquare cloths by the medium depth, and add the quantity in the lining and pieces.

EXAMPLE.

	$10\frac{1}{2}$	yards; depth of the leech.
	3	- - - - - - - - - - bunt.
	$\frac{1}{2}$) $13\frac{1}{2}$	
	$6\frac{3}{4}$	medium depth.
	$11\frac{1}{2}$	ſquare cloths.
	$77\frac{5}{8}$	yards in the ſail.
	$4\frac{1}{2}$	- - - - - - lining and pieces.
Total	$82\frac{1}{8}$	yards for a 20 gun ſhip.

MAIN TOPGALLANT STAYSAIL.

This ſail is quadrilateral, cut ſquare on the foot, and made of canvas No. 7. It has a bunt from one-third to three-ſevenths of the depth of the leech, and is extended on the main-topgallant-ſtay-ſail-ſtay between the main and fore topgallant-maſts.

The leech is nearly of the ſame depth as the leech of the middle-ſtayſail, and there are from 3 to 6 cloths more in the foot than the leech is yards in depth. In the merchant-ſervice, there are from 2 to 8 cloths more in the foot than the leech is yards in depth.

The ſtay is gored 24 inches per cloth. If the depth of the bunt be ſubtracted from the depth of the leech, the remainder, divided by the number of cloths, gives the depth of the gore on each cloth.

The bunt is lined with half a breadth of cloth, the clue-piece is two yards long, and the peek-piece one yard. In the merchant-ſervice, the clue-piece is only one yard; and the tack, nock, and peek pieces are each half a yard in length.

The holes on the ſtay are 27 inches aſunder. In ſewing on the bolt-rope, three inches ſlack ſhould be taken up in every yard in the ſtay, and one inch in every cloth in the foot.

Thimbles are generally ſtuck at the tack, nock, and peek. When there are no thimbles, the tack and peek are the ſame as the clue.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add the depth of the bunt and depth of the leech together, and halve the product for a medium depth, which multiply by the number of cloths in the ſail, and add the quantity in the lining and pieces.

EXAMPLE.

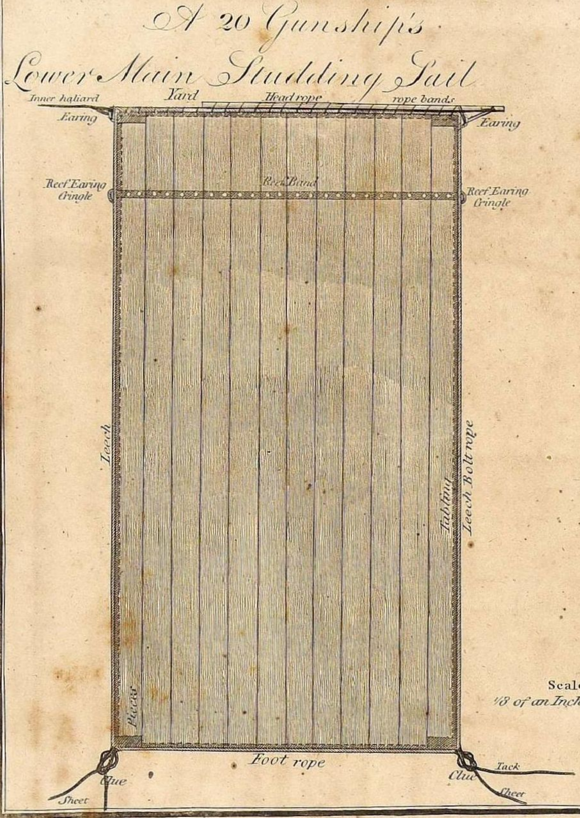
$10\frac{3}{4}$ depth of the leech.
$2\frac{1}{4}$ - - - - - - bunt.

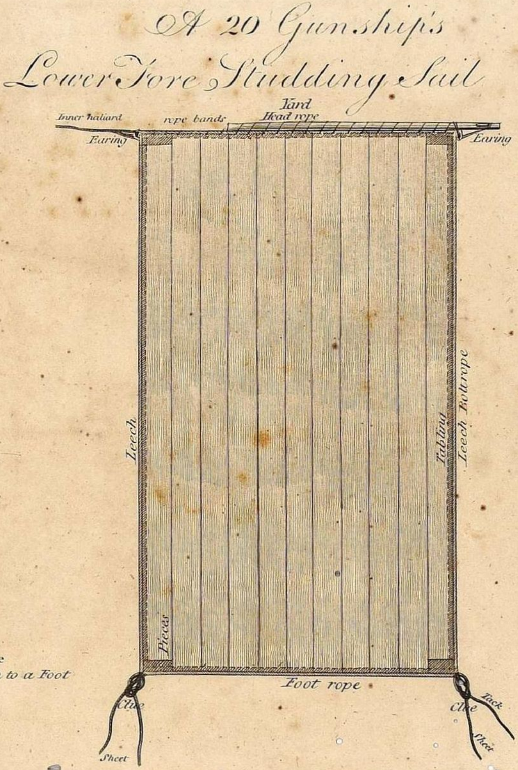
$\frac{1}{2}$) 13

$6\frac{1}{2}$ medium depth.
13 number of cloths.

$84\frac{1}{2}$ yards in the ſail.
$4\frac{1}{8}$ - - - - - - lining and pieces.

Total $88\frac{5}{8}$ yards for a ſhip of 20 guns.





Scale
1/8 of an Inch to a Foot

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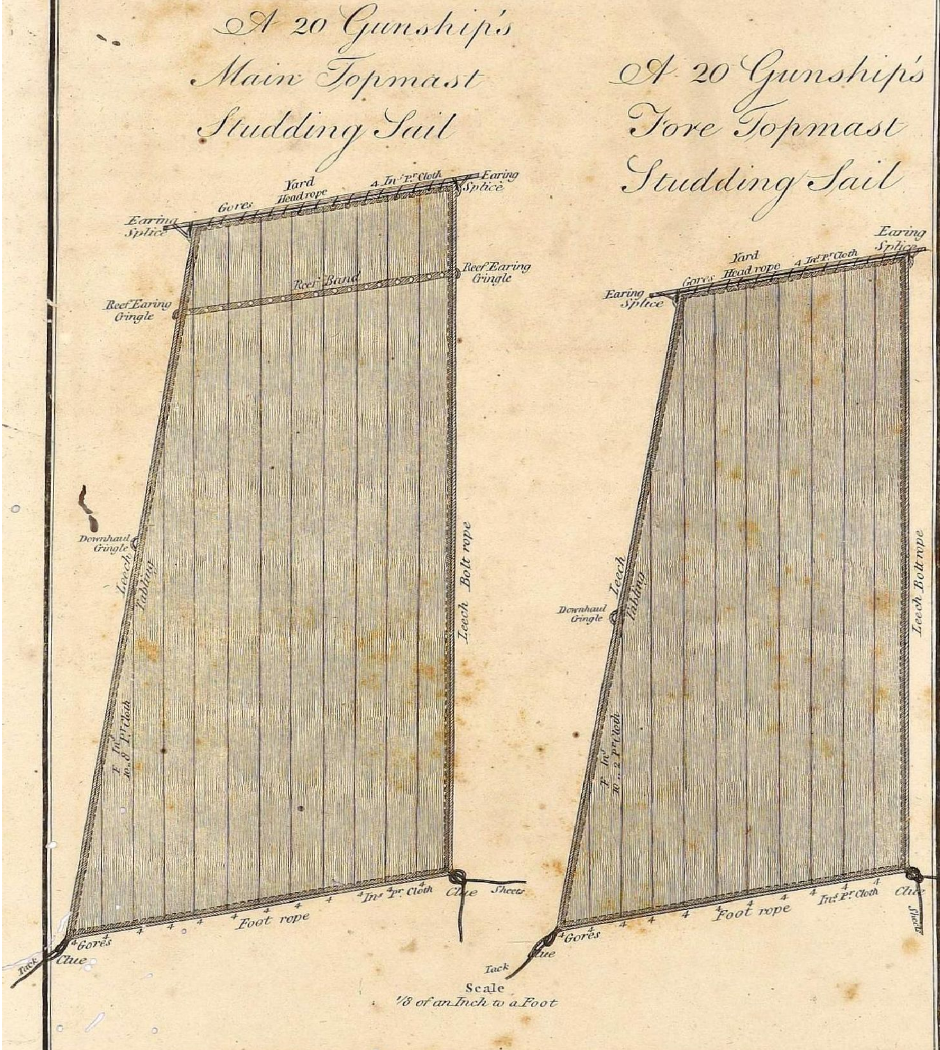

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LOWER MAIN STUDDINGSAILS.

Theſe ſails are quadrilateral, cut ſquare on the head, foot, and leeches, and made of canvas No. 6 or 7. They ſpread beyond the ſkirts or leeches of the main-courſe, the heads being bent to the main-ſtuddingſail-yards, and the feet extended on the boom.

The ſails are 2 or 3 yards deeper than the main-courſe. In large ſhips, two cloths more, and, in ſmall ſhips, one cloth leſs, are allowed, for the breadth, than the number of yards in the depth. But, in the merchant-ſervice, they are only one yard deeper, or of the ſame depth as the main-courſe; and from 2 to 7 cloths are allowed in the foot more than the number of yards in the depth.

A reef-band, 6 inches wide, is put on at one-eighth of the depth from the head, and pieces of one-quarter or half a yard in length are ſometimes put on at the clues and earings.

One inch of ſlack-cloth ſhould be taken up, in ſewing on the bolt-rope, in every cloth in the foot. The rope ſhould be ſewed home to the clue, and a reef-cringle made at each end of the reef-band.

LOWER FORE STUDDINGSAILS.

Theſe ſails are quadrilateral, ſquare on the head, foot, and leeches, and made of canvas No. 6 or 7. They are ſpread beyond the ſkirts, or leeches of the fore-courſe, the heads being bent to the fore-ſtuddingſail-yards, and the feet extended on the boom.

The depth is the ſame as the main-courſe, or from one to two yards more, and the breadth is one cloth leſs than the main-ſtuddingſail.

One quarter or half a yard of cloth is ſometimes put on at the clues and earings. One inch of ſlack-cloth ſhould be taken up in every cloth in the foot, when ſewing on the bolt-rope, which is to be ſewed home to the clues.

RULE TO FIND THE QUANTITY OF CANVAS IN THE LOWER MAIN AND FORE STUDDINGSAILS.

Multiply the depth of the ſail by the number of cloths, and add the quantity in the pieces.

EXAMPLE FOR THE MAIN-STUDDINGSAIL.

	13	yards deep.
	12	number of cloths.
	156	yards in the ſail.
	$1\frac{3}{4}$	- - - - - - reef band.
	1	- - - - - - pieces.
Total	$158\frac{3}{4}$	yards for a 20 gun ſhip.

EXAMPLE FOR THE FORE-STUDDINGSAIL.

	11	yards deep.
	11	number of cloths.
	121	yards in the ſail.
	1	- - - - - - pieces.
Total	122	yards for a ſhip of 20 guns.

MAIN TOPMAST STUDDINGSAILS.

These sails are quadrilateral, and made of canvas No. 6 or 7. They are spread beyond the skirts or leeches of the main-topsail, the heads being bent to their respective yards, and the feet extended on the boom.

The depth is one yard more than the main-topsail, and two cloths less are allowed for the breadth of the foot than the number of yards in the depth of the leech.

Four cloths are gored on the outer leech, in the navy, and from 4 to 7 cloths in the merchant-service; and a regular gore is made on the head and foot of 4 inches per cloth, decreasing to the outer earing at the head, and increasing to the tack or outer clue at the foot.

A reef-band, 6 inches broad, is put on at one-eighth of the depth of the sail from the head.

One inch and a half slack-cloth should be taken up in every yard in the gored leech, when sewing on the bolt-rope, and one inch in every cloth in the foot, but none in the square leech. The rope is to be sewed home to the clue. One reef-cringle is made on the leeches at each end of the reef-band, and a downhaul-cringle is made on the outer leech, about half the depth of the leech from the head.

FORE TOPMAST STUDDINGSAILS.

These sails are quadrilateral, and made of canvas No. 6 or 7. They are spread beyond the leeches of the fore-topsail, the heads being bent to their respective yards, and the feet extended on the boom.

The depth is one yard more than the main-topsail, and one cloth less is allowed for the breadth of the foot than in the main-topmast-studdingsail.

Four cloths are gored on the outer leech, in the navy, and from 4 to 7 cloths, in the merchant-service; and a regular gore is made on the head and foot of 4 inches per cloth, decreasing to the outer earing at the head, and increasing to the tack or outer-clue at the foot.

One inch and a half slack-cloth should be taken up in every yard in the gored leech, when sewing on the rope, and one inch in every cloth in the foot, but none in the square leech. The rope is to be sewed home to the clue, and a downhaul-cringle is made on the outer leech at about half the depth of the sail from the head.

RULE TO FIND THE QUANTITY OF CANVAS IN THE MAIN AND FORE TOPMAST STUDDINGSAILS.

Add the number of cloths in the head and foot together, and halve the product to make it square, then multiply the number of square cloths by the depth, and add the quantity in the bands, &c.

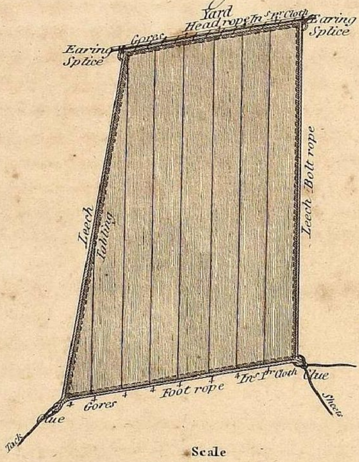
EXAMPLE FOR THE MAIN TOPMAST STUDDINGSAIL.

	8	cloths in the head.
	12	- - - - - - foot.
	$\frac{1}{2}$) 20	
	10	square cloths.
	14	yards deep.
	$1\frac{3}{4}$	- - - in the reef-bands.
Total	$141\frac{3}{4}$	yards, for a 20 gun ship.

EXAMPLE FOR THE FORE TOPMAST STUDDINGSAIL.

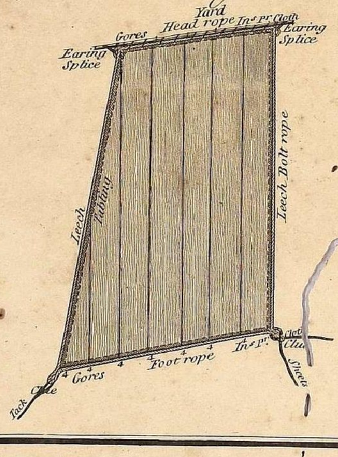
	7	cloths in the head.
	11	- - - - - - foot.
	$\frac{1}{2}$) 18	
	9	square cloths.
	$12\frac{1}{2}$	yards deep.
Total	$112\frac{1}{2}$	yards, in a 20 gun ship.

A 20 Gunship's Main Topgallant Studding Sail



Scale
1/8 of an Inch to a Foot

A 20 Gunship's Fore Topgallant Studding Sail



Pub.d as the Act directs Feby. 14th 1793 for D. Steel Bookseller, Tower Hill.
J. Cooke sc. Mill Hill, Midd.x

MAIN TOPGALLANT STUDDING-SAILS.

Theſe ſails are quadrilateral, and made of canvas No. 7 or 8. They are ſpread beyond the ſkirts or leeches of the main-topgallant-ſail, the heads being bent to their reſpective yards, and the feet extended on the boom.

The depth is half a yard more than the main-topgallant-ſail. In large ſhips, there are 5 cloths more allowed for the breadth of the foot than the number of yards in the depth, but in ſmall ſhips there are only 3 more, or the ſame number of cloths in the breadth of the foot as yards in the depth of the leech.

The outer leech is gored from two to four cloths, and an even gore is made on the head and foot from 3 to 5 inches per cloth, decreaſing to the outer earing at the head, and increaſing to the tack at the foot.

One inch and a half of ſlack-cloth ſhould be taken up in every yard, when ſewing the bolt-rope on the gored leech, and one inch in every cloth in the foot, but none in the ſquare leech. The rope is ſewed home to the clue, and the clue is ſeized with ſmall line.

FORE TOPGALLANT STUDDING-SAILS.

Theſe ſails are quadrilateral, and made of canvas No. 7 or 8. They are ſpread beyond the leeches of the fore topgallant-ſail, the heads being bent to their reſpective yards, and the feet extended on the boom.

The depth is half a yard more than the main-topgallant-ſail. In large ſhips, there are 5 cloths more allowed for the breadth of the foot than the number of yards in the depth, but in ſmall ſhips there are only 3 more, or the ſame number of cloths in the foot as yards in the depth of the leech.

The outer leech is gored from two to four cloths, and an even gore is made on the head and foot from 3 to 5 inches per cloth, decreaſing to the outer earing at the head, and increaſing to the tack at the foot.

One inch and a half of ſlack-cloth ſhould be taken up in every yard in the gored leech, when ſewing on the rope, and one inch in every yard in the foot, but none in the ſquare leech.

RULE TO FIND THE QUANTITY OF CANVAS IN MAIN AND FORE TOPGALLANT STUDDING-SAILS.

Add together the number of cloths in the head and foot, and halve the product to make it ſquare; then multiply the number of ſquare cloths by the depth of the ſail.

EXAMPLE FOR THE MAIN TOPGALLANT-SAIL.

	6	cloths in the head.
	8	- - - - - - foot.
½)	14	
	7	ſquare cloths.
	7	yards deep.
Total	49	yards, for a 20 gun ſhip.

EXAMPLE FOR THE FORE TOPGALLANT-SAIL.

	5	cloths in the head.
	7	- - - - - - foot.
½)	12	
	6	ſquare cloths.
	6¼	yards deep.
Total	37½	yards, for a 20 gun ſhip.

JIB.

This ſail is triangular, and made of canvas No. 6 or 7. It is the foremoſt ſail of a ſhip, and differs in ſhape but little from a ſtayſail. The foot is extended from the outer end of the bowſprit by the jib-boom, and it ſlides on the jib-ſtay, which is attached to the fore-topmaſt head. The leech is about twice the depth of the leech of the fore-ſtayſail, and one cloth more is allowed for the breadth of the foot, than the leech is yards in depth.

The ſtay is cut with a curve, or roach. The length of the regular gore per cloth may be found by dividing the depth of the ſtay by the number of cloths. The gores ſhould be allowed full, and the curve cut fair after the ſail is ſewed together.

The foot has an even gore of 3 inches per cloth, decreaſing from the tack to the clue, which is governed by the ſtive of the bowſprit. For brigs, this ſail has a circular foot, and ſometimes for ſhips, in the merchant-ſervice. The ſeams are generally one inch broader at the foot than at the head, when cut with a circular or roach foot.

The clue-piece is two yards, and the peek-piece is one yard long, and the cloth at the tack is ſo cut as to fall to the foot and form its own lining.

Marling-holes are made two feet each way from the clue, and one hole is made in every yard in the ſtay. In ſewing on the bolt-rope, four or five inches of ſlack-cloth ſhould be taken up in every yard in the ſtay, and one inch in every cloth in the foot.

Iron thimbles are ſometimes ſeized in at the tack and peek; but, when thimbles are not uſed, the tack and peek are the ſame as the clue, and are frequently marled on.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Multiply the depth of the leech by half the number of cloths in the ſail, and add to the product the quantity in the foot-gores and pieces.

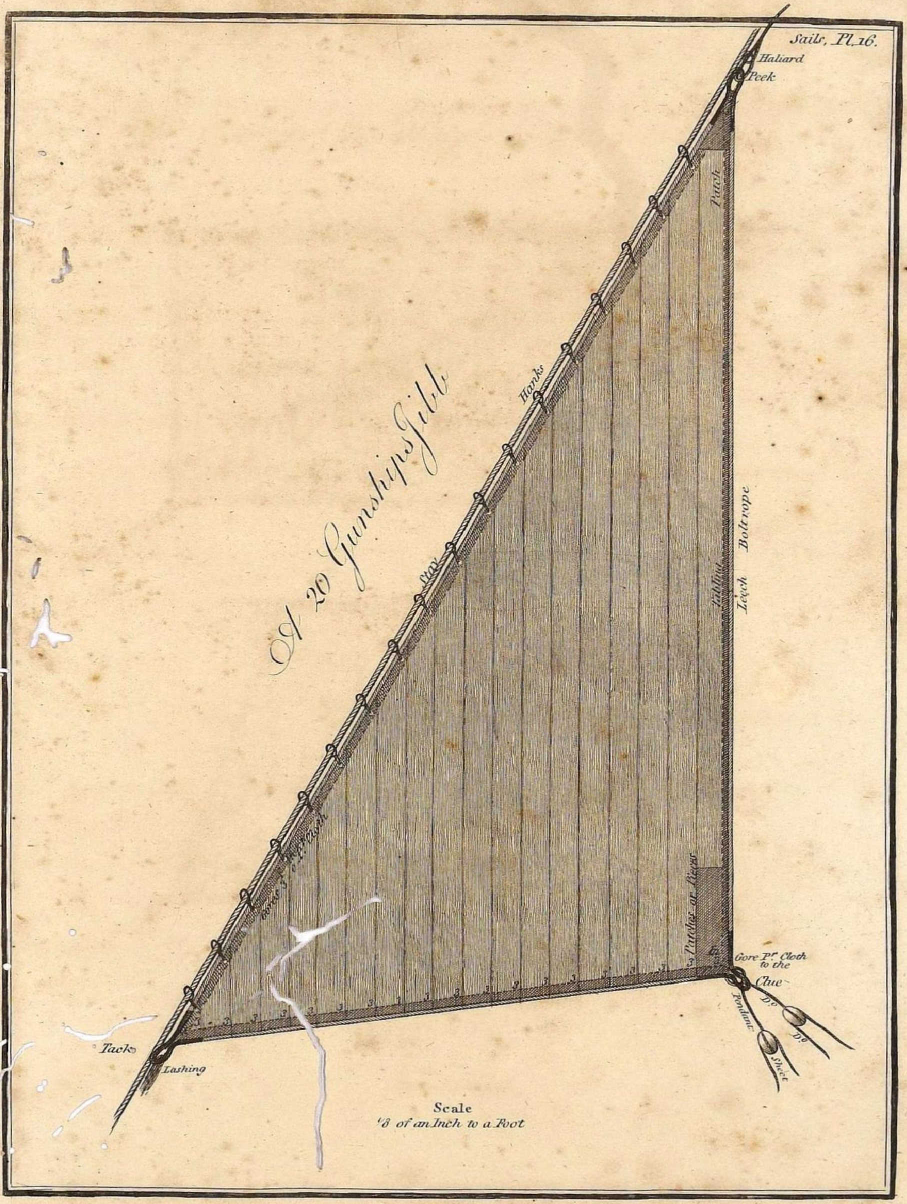
To find the quantity in the foot-gores. Multiply half the number of cloths in the foot by the regular gore per cloth, and the product, multiplied by the whole number of cloths gives the anſwer.

EXAMPLE.

	18	yards, depth of the leech.
	$9\frac{1}{2}$	half the number of cloths.
	171	yards.
	15	yards in the foot gores.
	4	- - - - - - pieces.
Total	190	yards, for a 20 gun ſhip.

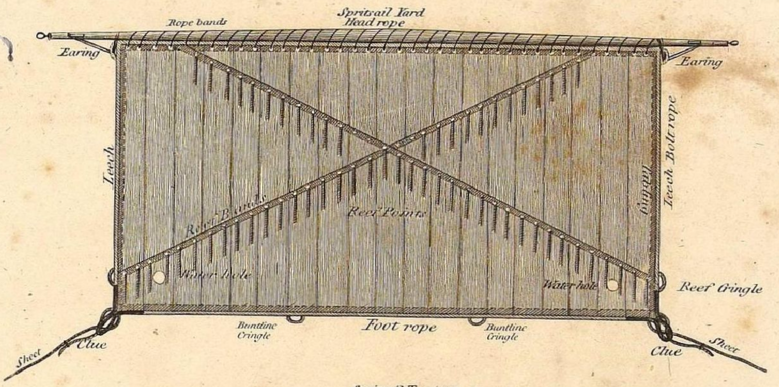
Gores.

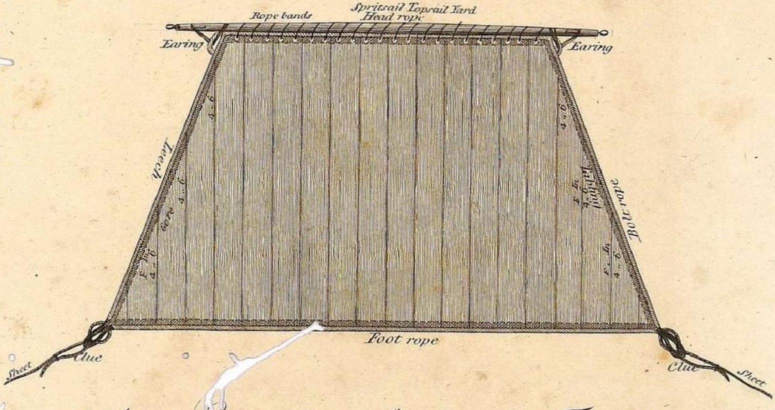
	$9\frac{1}{2}$	half the number of cloths.
	3	inches, gore per cloths.
	$28\frac{1}{2}$	inches.
	19	cloths in the foot.
Total	$541\frac{1}{2}$	inches, or 15 yards.



Pub.d as the Act directs Feb.y 14th 1793 for D. Steel. Bookseller. Tower Hill.

A 20 Gunships Spritsail Course.





A 20 Gunships Spritsail Topsail

Scale
1/8 of an Inch to a Foot

Pub.d as the Act directs Feb.y 14.th 1793. for D. Steel Bookseller Tower Hill.

SPRITSAIL COURSE.

This ſail is quadrilateral, ſquare on the head, foot, and leeches, and made of canvas No. 2 or 3. It is bent at the head to the ſpritſail-yard, and hangs under the bowſprit at right angles with the ſhip's length, extending within 9 inches of the cleats on the yard-arms.

Two reef-bands, one-third of the breadth of a cloth, are put on diagonally; the ends on the leeches being 27 inches from the clues, and thoſe at the head on the firſt or ſecond ſeam from the ear-ings. Sometimes a reef-band is put on from leech to leech, at one-fifth of the depth of the ſail from the head.

A water-hole, from 4 to 6 inches diameter, is made in the ſecond cloth from each leech, near the foot, or oppoſite the reef-cringles. The marling holes extend two feet each way from the clues.

A reef-cringle is made on the leeches at the end of each reef-band, and two buntline-cringles are made on the foot-rope, at one-third of the breadth of the foot from each clue.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Multiply the number of cloths by the depth, and add the quantity in the reef-bands.

EXAMPLE.

	19	number of cloths.
	$5\frac{1}{2}$	yards; depth of the leech.
	$104\frac{1}{2}$	yards in the ſail.
	$7\frac{1}{2}$	- - - - - - reef-bands.
Total	112	yards, for a 20 gun ſhip.

SPRITSAIL TOPSAIL.

This ſail is quadrilateral, cut ſquare on the head and foot, and made of canvas No. 6 or 7. The head is bent to the ſpritſail topſail-yard, which hangs under the jib-boom at right angles with the ſhip's length, and the foot is ſpread on the ſpritſail-yard. It has as many cloths in the head as the fore-topgallant-ſail; and is of the ſame depth as the main-topgallant-ſail, in the navy, but from one to two yards deeper, in the merchant-ſervice.

The leeches are gored from 4 to 5 cloths ſufficiently for the foot to ſpread to the cleats on the outer ends of the ſpritſail-yard.

Two inches of ſlack-cloth ſhould be taken up in every cloth in the foot, when ſewing on the bolt-rope, and one inch in every yard in the leeches.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add together the number of cloths in the head and foot, and halve the ſum, to make it ſquare: then multiply the number of ſquare cloths by the depth.

EXAMPLE.

	$11\frac{1}{2}$	cloths in the head.
	$19\frac{1}{2}$	- - - - - - -foot.
	$\frac{2}{2})$ 31	
	$15\frac{1}{2}$	ſquare cloths.
	6	yards deep.
Total	93	yards, for a 20 gun ſhip.

DRIVER BOOMSAIL.

This ſail is quadrilateral, made of canvas No. 5 or 6, and is occaſionally hoiſted to the mizen-yard or gaff, in light fair winds. The fore leech is attached to the mizen-maſt, and the head to the mizen-yard or gaff; the foot is extended by the boom which hangs fore and aft in the plane of the ſhip's keel.

The fore-leech is nearly of the ſame depth as the fore-leech of the mizen courſe, and the after-leech is from 2 to 4 yards deeper than the after-leech of the mizen-courſe.

The head, foot, and maſt-leech, are cut with a roach or curve; and, as no ſtrict rule can be laid down, the gores muſt be judiciouſly encreaſed or dimininiſhed according to the ſweep required.

The gore on the head is at the rate of from 9 to 12 inches per cloth; and on the foot from 6 to 9 inches; or about 27 inches for every cloth in the maſt-leech. From 4 to 6 cloths next the clue are cut ſquare; or, the fifth cloth next the clue being ſquare, the other four cloths are ſhort-gored one inch per cloth to the clue.

From 4 to 6 cloths are gored on the maſt-leech; and, if the depth of the leech be divided by the number of cloths in it, the quotient will be the regular gore per cloth, which muſt be augmented on the middle cloths ſo as to form the ſweep required.

The clue-lining is two or three yards in length, and the tack, nock, and peek pieces are each one yard in length.

The ſeams are 6 inches broad, 6 feet up the ſail from the foot; and 2 inches broad 4 feet down from the head: the remainder is one inch broad.

Two inches of ſlack-cloth ſhould be taken up with the rope in every yard in the maſt-leech, and one inch in every cloth in the foot.

Iron thimbles are generally ſpliced in the rope at the tack, nock, peek, and clue, which are otherwiſe fitted as the mizen-courſe.

Cringles for the lacing are made on the maſt-leech 30 inches aſunder.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add together the number of cloths in the head and foot, and halve the product to make it ſquare: add together the depth of the fore and after leeches, and halve the ſum for a medium depth: then multiply the number of ſquare cloths by the medium depth, and add the quantity in the foot-gores and pieces.

To find the quantity in the foot gores. Add together the depth of the gore on each cloth to the tack, and halve it for a medium; then multiply by the number of cloths gored to the tack.

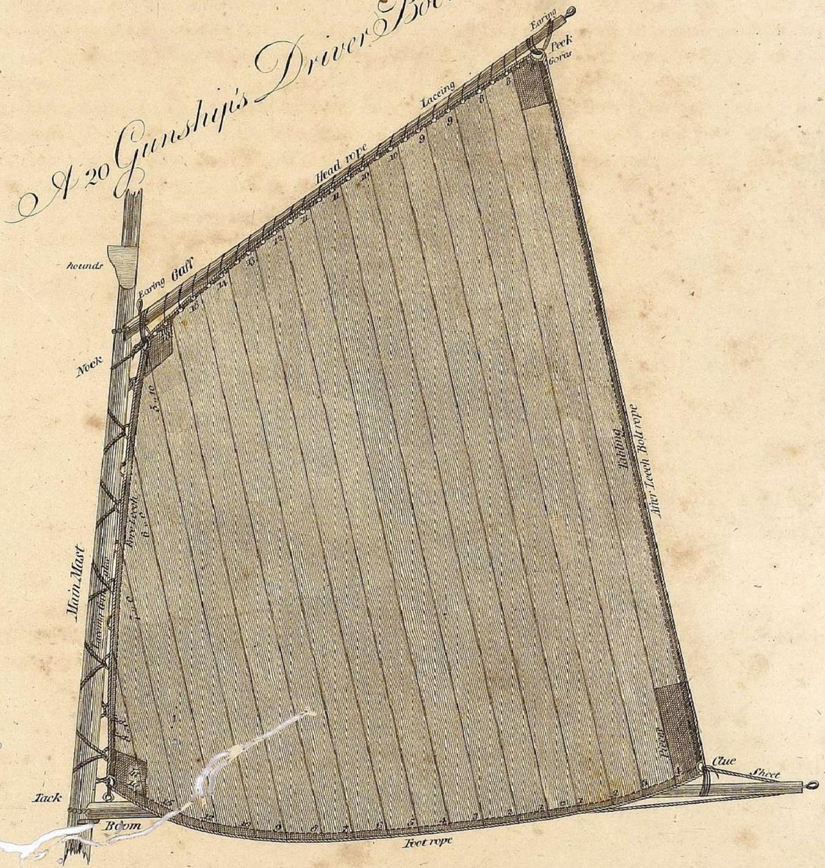
EXAMPLE.

14	cloths in the head.
18	- - - - - - foot.
½) 32	
16	ſquare cloths.
12½	yards; medium depth.
200	yards in the ſail.
18	- - - - - - foot gore.
5	- - - - - - pieces.
Total 223	yards for a 20 gun ſhip.

Gores to the tack
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 18. } Total 100 inches.

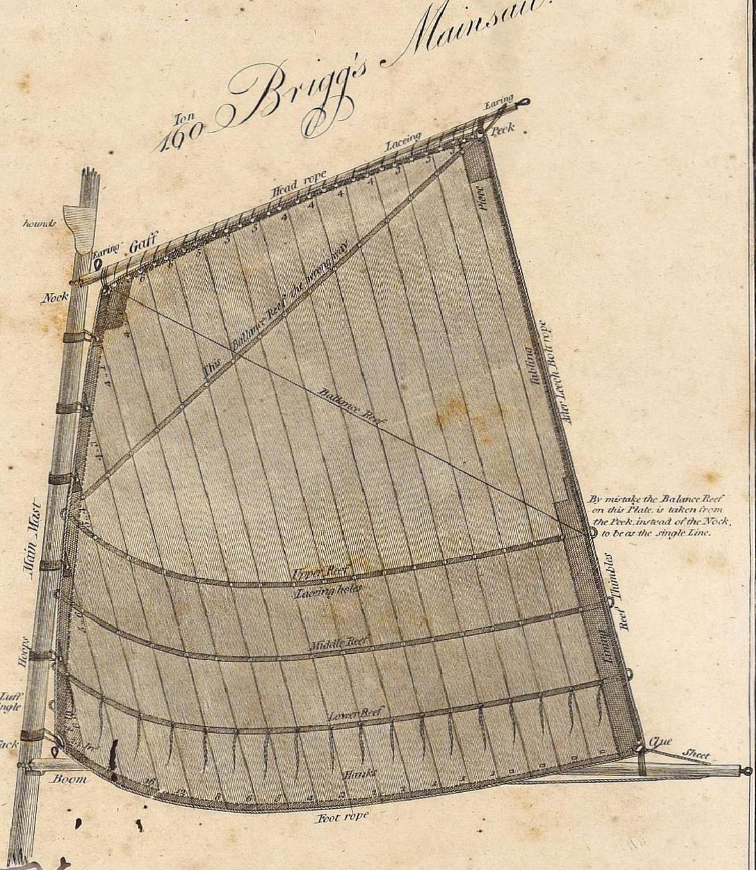
½) 100	
50	inches.
13	cloths gored to the tack.
Total 650	inches, or 18 yards.

A 20 Gunship's Driver Boom Sail.



Scale
1/8 of an Inch to a Foot

Pub.d as the Act directs. Feb.y 24.th 1793 for D. Steel. Bookseller. Tower Hill.
J. Cooke, sc. Mill Hill Midd.x



Scale
1/8 of an Inch to a Foot

Pub.d as the Act directs. Feb.y 14th 1793 for D. Steel, Bookseller, Tower Hill.
J. Cooke sc. Mill Hill Midd.x

A BRIG'S MAINSAIL.

This ſail is quadrilateral, and made of canvas No. 5 or 6. The fore-leech is in depth nearly the length of the main-maſt from the under part of the hounds to the boom, and is faſtened, in different places, to hoops which encircle the maſt. The depth of the after-leech is about one-third more than the depth of the fore-leech. The head is bent to the gaff, and ſpreads within 9 inches of the cleats on the outer end; and the foot is extended by the boom, which hangs abaft the main-maſt, and ſpreads within 18 inches of the ſheave-hole at the outer end.

The ſeams are three inches broad 8 feet up the ſail from the foot, and two inches broad 8 feet down from the head: the remainder is one inch broad.

The head and maſt-leech are ſometimes gored with a ſmall circular ſweep, which muſt be regulated by practice. The *regular* gore on the head is from 4 to 5 inches per cloth, and the ſweep may be cut after the ſail is ſewed together.

The foot is gored with a circular ſweep, at the rate of 5 or 7 inches per cloth, leaving 4 or 5 ſquare cloths at the clue, or at the rate of 14 to 18 inches per cloth for every cloth in the maſt-leech, which has 5 or 6 gored cloths in it.

This ſail has three reef-bands, 6 inches broad, parallel to the foot. The upper one is nearly half way up the fore-leech, and the others are at equal diſtances between that and the foot; it alſo ſometimes has a *balance-reef* from the nock to the upper reef-cringle on the after-leech.

The after-leech is lined with one breadth of cloth from the clue to one yard above the upper reef-band; half a yard of the lining is cut down at the upper end, and the inner part is doubled under, or cut off. The peek-piece is one yard in length, and the fore-leech is lined with half a breadth of cloth; or ſometimes pieces, one yard in length, are put on at the tack and nock, and ſmall triangular pieces at each hole.

Four inches of ſlack-cloth ſhould be taken up with the rope in every yard in the maſt-leech.

Large iron thimbles are ſtuck in the cringles at the clue, peek, nock, and tack; alſo in the cringles made on the leeches at the ends of the reef-bands: a luff-cringle is made on the maſt-leech, equidiſtant from the lower reef-band and the foot, which alſo has a thimble.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add together the number of cloths in the head and foot, and halve the product to make it ſquare: add together the depth of the fore and after leeches, and halve their ſum for a medium depth: then multiply the number of ſquare cloths by the medium depth, and add the quantity in the gores, linings, and pieces.

To find the quantity in the foot-gores. Add together the gores on each cloth, and multiply half the ſum by the number of cloths gored.

EXAMPLE.

$13\frac{1}{2}$ cloths in the head.
19 - - - - - - foot.

$\frac{1}{2}$) $32\frac{1}{2}$

$16\frac{1}{4}$ ſquare cloths.
$11\frac{1}{4}$ yards: medium depth.

183 yards.
$20\frac{1}{2}$ yards in the foot-gores.
$18\frac{1}{4}$ - - - - - - reef bands, and linings.

Total $221\frac{3}{4}$ yards.

Gores on each cloth.
1, 1, 1, 2, 2, 3, 4, 5, 6, 8, 12, 16, 20, 24. } Total 105 inches.
$\frac{1}{2}$) 105

$52\frac{1}{2}$ inches: medium gore per cloth.
14 number of gored cloths.

Total 735 inches, or 20 yards and a half, nearly.

CUTTER'S MAINSAIL.

This ſail is quadrilateral, and made of canvas No. 1 or 2. The fore-leech is nearly of the depth of the maſt from the under part of the hounds to the boom, and is faſtened in different places to hoops which encircle the maſt: the after-leech is about one-third deeper than the fore-leech. The head is bent to a gaff and ſpreads within 18 inches of the cleats at the outer end; and the foot ſpreads within 2 or 3 feet of the ſheave-hole at the outer end of the boom, which hangs fore and aft abaft the maſt.

Six or eight cloths are gored on the fore-leech, and its length divided by that number of cloths gives the length of the gore on each cloth; the head is gored at the rate of 5 or 7 inches per cloth; and ſometimes the fore-leech and head are cut with a ſmall circular ſweep, which muſt be cut by judgement, or after the ſail is ſewed together.

In the merchant-ſervice, the head is generally wider, and peeks leſs, than in the royal-navy.

The foot is gored with a circular ſweep at the rate of 5 to 7 inches per cloth from the tack to the middle of the foot; then, two or three cloths being left ſquare, the remaining cloths to the clue are gored at the rate of a full inch per cloth.

Four reef-bands, 8 inches broad, are put on parallel to the foot; the upper one is about three-ſevenths of the depth up the fore-leech from the foot, and the others at equal diſtances between that and the foot.

The ſeams are 5 inches broad 12 feet up the ſail from the foot, and 3 inches broad 8 feet down from the head: the remainder is one inch and a half broad.

In ſewing on the rope four or five inches of ſlack-cloth ſhould be taken up in every yard or the depth of the fore-leech.

Large iron thimbles are ſtuck in the cringles at the clue, peek, nock, and tack, and alſo in the reef-cringles at the ends of the reef-bands. A luff-cringle is made on the fore-leech between the lower reef-band and the tack, which alſo has a thimble.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add together the depth of the fore and after leeches, and halve the ſame for a medium depth: add the number of cloths in the head and foot together, and halve the ſum to make it ſquare: then multiply the number of ſquare cloths by the medium depth, and add the quantity in the foot gores, linings, and pieces.

To find the quantity of canvas in the foot-gores. Add together the gores from the tack to the firſt ſquare cloth in the foot, and multiply half the ſum by the number of cloths in the foot: then add together the gores from the clue to the firſt ſquare cloth, and multiply half the ſum by the number of cloths gored to the clue; which, ſubtracted from the product of the gores to the tack, gives the anſwer.

EXAMPLE.

24 yards: depth of the after-leech.
18 - - - - - - - - - - - fore-leech.

$\frac{1}{2}$) 42

21 yards: medium depth.
$25\frac{7}{8}$ ſquare cloths.

$543\frac{3}{8}$ yards.
$42\frac{1}{4}$ yards in the foot-gores.
$53\frac{3}{4}$ - - - - - - reef-bands, linings and pieces.

Total $639\frac{3}{8}$ yards.

Gores to the tack.
20, 17, 15, 13, 11, 9, 7, 5, 4, 3, 2, 2, 1, 1. } Total 110 inches.
$\frac{1}{2}$) 110

55 inches.
30 cloths in the foot.

1650 inches.

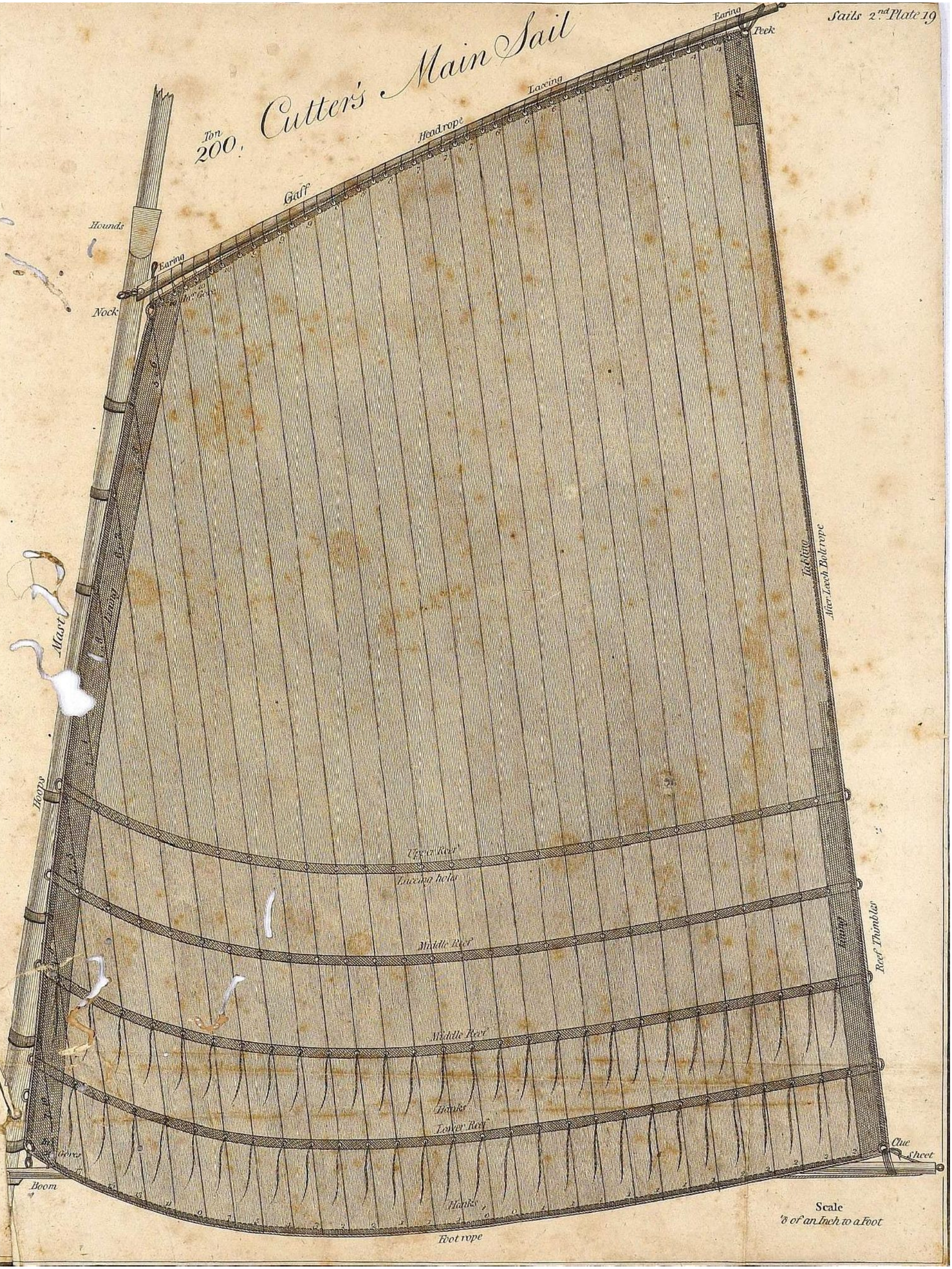
Gores to the clue.
3, 2, 2, 2, 2, 2, 1, 1, 1, 1, 1, 1, 1. } Total 20 inches.
$\frac{1}{2}$) 20

10 inches.
13 cloths gored to the clue.

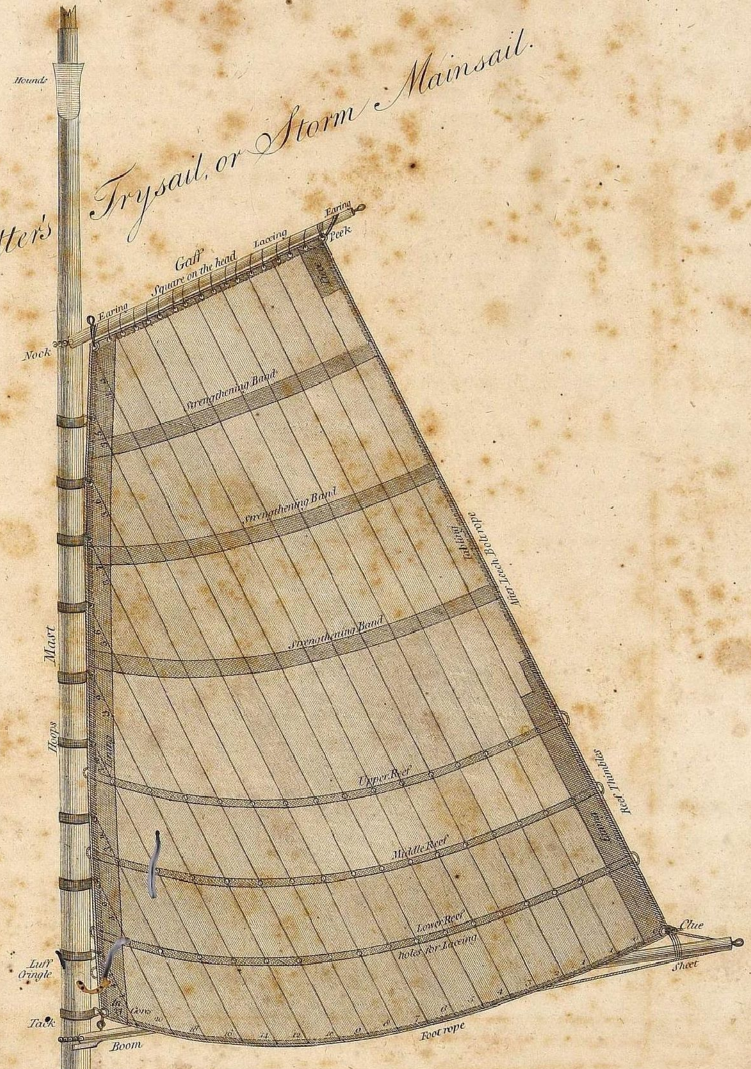
130 inches.

1650 inches in the tack-gores.
130 inches in the clue-gores.

Total 1520 inches, or $42\frac{1}{4}$ yards.


200 Ton Cutter's Main Sail
Earing
Peek
Lacing
Headrope
Gaff
Hounds
Earing
Nock
Mast
Hoops
Tabling
After Leech Bolt rope
Upper Reef
Lacing holes
Middle Reef
Reef Thimbles
Middle Reef
Hanks
Lower Reef
Clue
Sheet
Boom
Hanks
Foot rope
Scale
⅛ of an Inch to a Foot

Ton 200, Cutter's Trysail, or Storm Mainsail.



Scale
1/8 of an Inch to a Foot

CUTTER'S TRYSAIL.

This ſail is occaſionally uſed, inſtead of the main-ſail, in ſtormy weather, and is quadrilateral, generally cut ſquare on the head, and made of canvas No. 1 or 2. It is extended as the main-ſail, the fore-leech being attached to hoops which encircle the maſt. The head is bent to a gaff, and the foot is extended by the boom.

In the head of the tryſail there are two-fifths of the number of cloths that are in the head of the [illegible] the fore-leech is about three-fourths of the depth of the fore-leech of the main-ſail, and [illegible]ech is one-ſixth deeper than the fore-leech.

[illegible]r ten cloths are gored on the fore-leech; and its depth, divided by the number of cloths, [illegible]ngth of each gore: if cut with a ſweep, the gores can only be regulated by practice, or [illegible] ſweep cut after the ſail is ſewed up.

The foot is gored with a circular ſweep at the rate of 5 or 7 inches per cloth from the tack, leaving two or three ſquare cloths at the clue.

The ſeams ſhould be 5 inches broad 12 feet up from the foot; and 3 inches broad 8 feet down from the head. The remainder is one inch and a half broad.

This ſail has three reef-bands, 6 inches wide, parallel with the foot; the upper one is three-eighths of the depth of the fore-leech from the foot, and the others are at equal diſtances between the foot and the upper one. It alſo has three ſtrengthening bands of half a breadth of cloth, at equal diſtances between the upper reef-band and the head, which are ſeamed on, and ſtuck along the middle.

The after-leech is lined with one breadth of cloth, from the clue to one yard and a half above the upper reef-band, where it is cut half way acroſs; and, one half of it being cut off, it is ſo continued about one yard higher.

[illegible]e inches of ſlack-cloth ſhould be taken up with the rope in every yard in the fore-leech.

[illegible]ables are ſtuck in cringles made at the clue, peek, nock, and tack; alſo in reef-cringles o[illegible]ches at the ends of the reef-bands, and in a luff-cringle made on the fore-leech between the lo[illegible]eef-cringle and the foot.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add together the number of cloths in the head and foot, and halve the ſum to make it ſquare; then add the depth of the fore and after leeches together, and halve the ſum for a medium depth. Multiply the medium depth by the number of cloths, and add the quantity in the bands, linings, and pieces.

To find the quantity in the foot-gores. Add together the gores in each cloth, and multiply half the ſum by the number of gored cloths.

EXAMPLE.

[illegible] cloths in the head.
[illegible] - - - - - - - foot.

28

14 ſquare cloths.
$14\frac{3}{4}$ yards medium depth.

$206\frac{1}{2}$ yards.
35 yards in the foot-gores.
$41\frac{1}{2}$ - - - - - - - reef-bands, linings, and pieces.

Total 283 yards.

Gores on each cloth.
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20, 23. } Total 158
$\frac{1}{2}$) 158

79 inches.
16 number of gored cloths.

Total 1264 inches, or 35 yards.

SLOOP'S MAINSAIL.

This ſail is quadrilateral, and made of canvas No. 1 or 2. The fore-leech is nearly of the depth of the maſt from the under part of the hounds to the boom, and is attached to hoops which encircle the maſt. The after-leech is about one-third deeper than the fore-leech. The head is bent to the gaff, and ſpreads within 12 inches of the outer end; and the foot is extended by the boom, which hangs fore and aft abaft the maſt, and ſpreads within one or two feet of the ſheave-hole at the outer end.

The head is gored at the rate of 3 to 6 inches per cloth, and is ſometimes cut circular; and [illegible] foot is gored with a circular ſweep, at the rate of 5 inches, to 6 inches and a half per cl[illegible] cloths next the clue being left ſquare. The gore on the foot is governed by the number [illegible] the maſt-leech; from 12 to 14 inches gore being allowed on each cloth in the foot for eve[illegible] the maſt-leech.

From 6 to 8 cloths are gored on the fore-leech; and its depth, divided by that number of cloths, gives the length of each gore. It is ſometimes cut circular.

This ſail generally has three or four reef-bands, 4 or 6 inches broad, parallel to the foot; the upper one is about half way up the fore-leech, and the others are at equal diſtances between the upper one and the foot. Sometimes the reefs are fitted without bands. It alſo frequently has a balance-reef from the nock to the upper reef-cringle.

The after-leech is lined with one breadth of cloth from the clue to two feet above the upper reef-band: this lining is cut down the middle at the upper end; and, half of it being cut away, the remaining part is ſo continued half a yard higher. The maſt-leech is lined with half a breadth of cloth from the tack to the nock; and the peek-piece is one yard and a half in length. Sometimes pieces one yard and a quarter long are put on at the nock and tack, and ſmall triangular pieces at each hole, inſtead of a maſt-lining.

The ſeams ſhould be 4 inches broad 9 feet up the ſeam from the foot; and two inches [illegible] et down the ſeam from the head. The remainder ſhould be one full inch broad.

The bolt-rope on the maſt-leech ſhould be 2 inches and a half or 3 inches in circumference, [illegible] on the head, foot, and after-leech, one inch and a half. The clue-rope ſhould be 3 inches and [illegible] or 4 inches. Sometimes the foot-rope is not put on till the ſail is half worn. When ſewing on the rope, 4 inches of ſlack-cloth ſhould be taken up in every yard in the maſt-leech.

Iron thimbles are ſtuck in cringles at the tack, nock, peek, and clue. Thimbles are alſo ſtuck in cringles at the ends of the reef-bands, and in a luff-cringle on the maſt-leech.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add together the number of cloths in the head and foot, and halve the product to make it ſquare: add the depth of the fore and after leeches together, and halve the ſum for a medium depth: then multiply the number of ſquare cloths by the medium depth, and add the quantity in the foot gores, linings, bands, and pieces.

To find the quantity in the foot-gores. Add together the gores on each cloth, and multiply half the product by the number of gored cloths.

EXAMPLE.

13 cloths in the head.
21 - - - - - - foot.

$\frac{1}{2}$) 34

17 ſquare cloths.
$13\frac{3}{4}$ medium depth.

$233\frac{3}{4}$ yards.
24 yards in the foot gores.
27 - - - - - - reef-bands, linings, and pieces.

Total $284\frac{3}{4}$ yards.

Gores on each cloth.
1, 1, 2, 2, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 16, 20. } [illegible] 108 inches.
$\frac{1}{2}$) 108

54 inches medium gore per cloth.
16 No. of gored cloths.

Total 864 inches, or 24 yards.

...S TRYSA... OR STORM MAINSAIL.

..., generally cut ſquare on the head, and made of canvas No. 1 or 2. It is ... nainſail in ſtormy weather. The fore-leech is from three-fourths of the ... as the mainſail, and the after-leech is one-eighth deeper than the fore-leech. ... of the number of cloths that are in the head of the mainſail, and the foot is ... oreadth of the head.

... tended as the mainſail; the fore-leech being attached to hoops which encircle the ... is bent to a gaff, and the foot is extended by the boom.

... n cloths are gored on the fore-leech; and its depth, divided by the number of cloths, ... gth of each gore: if cut with a ſweep, the gores can only be regulated by judgement. ... is gored with a circular ſweep, at the rate of 6 or 8 inches per cloth.

... three or four reef-bands, from 4 to 6 inches wide, parallel with the foot; the upper ... arly half-way up the fore-leech, and the others are at equal diſtances between that and the foot. It alſo has two or three ſtrengthening bands, half a cloth broad, at equal diſtances aſunder, above the upper reef-band, which are ſtuck, or ſtitched, along the middle.

The after-leech is lined with one breadth of cloth, from the clue to one yard and a quarter above the upper reef-band, which is there cut down the middle; and one part being cut away, the other is ſo continued about one yard higher. The fore-leech is lined with half a breadth of cloth and, the peek with a piece one yard and a half in length. Sometimes a piece, one yard in length, is put on at the nock.

...e ſeams ſhould be 5 inches broad, 12 feet up the ſeam from the foot; and 3 inches broad, 8 feet ... ſeam from the head. The remainder is one inch and a half broad.

... bolt-rope for the maſt-leech ſhould be 2 inches and a half or 3 inches in circumference; for ... t, and after-leech, one inch and a half. The clue-ropes ſhould be three inches and a ... ches. When ſewing on the rope 4 or 5 inches of ſlack-cloth ſhould be taken up in ... the fore-leech.

... es are ſtuck in the clue, peek, nock, and tack; alſo in the cringles at the ends of the re... ands; and in a luff-cringle, made on the fore-leech, between the lower reef-cringle and the tack.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add together the number of cloths in the head and foot, and halve the product, to make it ſquare: add together the depth of the fore and after leeches, and halve the ſame for a medium depth; then multiply the number of ſquare cloths by the medium depth, andadd the quantity in the foot-gores, bands, linings, and pieces.

To find the quantity in the foot gores. Ad... the gores on each cloth together, and multiply half the ſum, by the number of gored cloths.

EXAMPLE.

5 cloths in the head.
... - - - - - foot.
...
... 20
—
10 ſquare cloths.
13 yards: medium depth.
—
130 yards.
7 - - -in the foot-gores.
28 - - - - - linings, bands, and pieces.
—
Total 185 yards.

Gores on each cloth.
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 16, 20. } Total 128 inches.
½) 128
—
64 inches.
15 number of gored cloths.
—
Total 960 inches: or 27 yards, nearly.

SLOOP'S SQUARE-SAIL, OR CROSS-

This ſail is quadrilateral, ſquare on the head and leeches, and made of head is bent to the croſs-jack-yard, and it hangs at right angles with the ſh to the deck, extending within 6 inches of the cleats on the yard-arms. Th depth four-fifths of the depth of the fore-leech of the mainſail.

The foot is gored one inch per cloth, encreaſing to each clue; two or three ſquare c in the middle.

This ſail has two reef-bands, four inches broad; the lower one is at one-ſixth of the ſail from, and parallel, to the foot; and the upper one is at the ſame diſtance from the h

One yard of cloth is put on at each clue, half a yard at each earing, and half a yard cringle on the leeches. Theſe linings are all put on the aftſide.

A reef-cringle is made at each end of the upper reef-band; and three bowline-cringles are made on each leech; the upper bowline-cringle is on the middle of the leech, and the others are equally diſtant from that and the clue.

Sometimes the clues are marled on; and, for this purpoſe, ten marling-holes are made each wav from the clues.

The bolt-rope, on the foot and leeches, ſhould be one inch and a half or two inches in circumference; and, on the head, one inch or one inch and a half. The clue-rope, when any, ſhould be two inches and a half. When ſewing on the bolt-rope, one inch of ſlack-cloth ſhould be taken every cloth in the head and foot.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Multiply the number of cloths by the depth, and add the quantity in the foot-gores, bands, and pieces.

To find the quantity in the foot-gores. Add together the gores on each cloth on one ſide of the ſail, and multiply th number of gored cloths.

EXAMPLE.

15 number of cloths.
$9\frac{3}{4}$ yards deep.

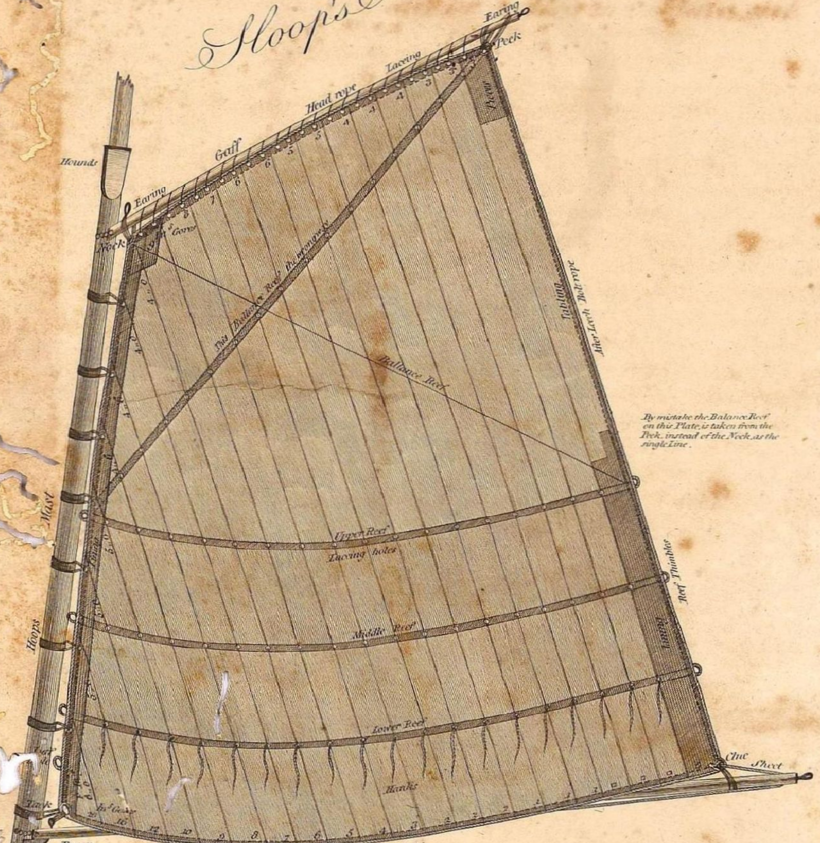
$146\frac{1}{4}$ yards.
$3\frac{1}{2}$ yards in the foot-gores.
$3\frac{1}{4}$ - - - - - - reef-bands.
6 - - - - - - pieces.

Total 159 yards.

Gores on one ſide of the ſail. 1, 2, 3, 4, 5, 6. } Total 21 inches.
21
6 half the number of gored cloths.

Total 126 inches, or 3 yards and a half.

Sloop's Mainsail.



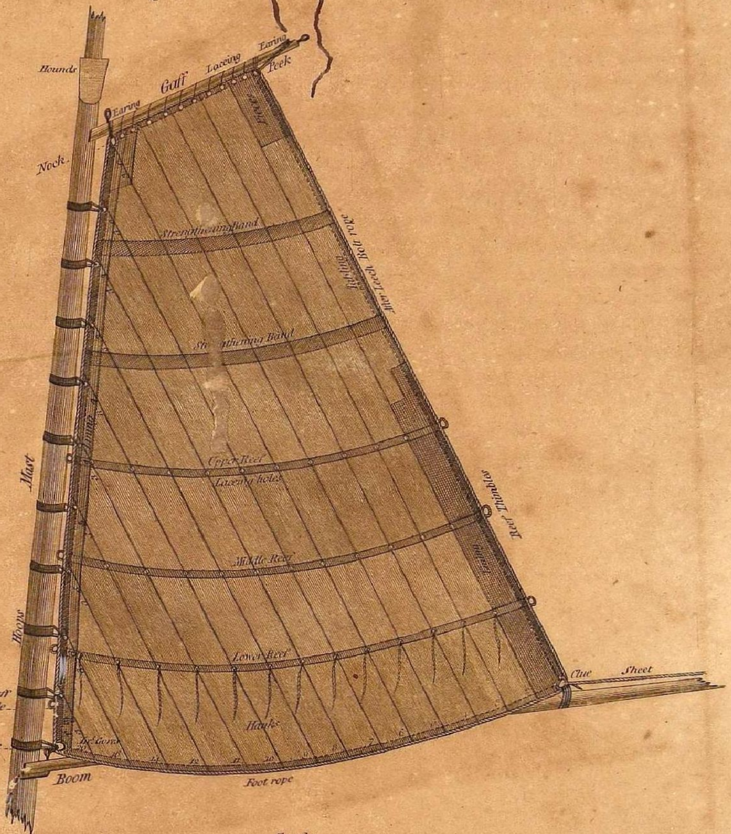
By mistake the Balance Reef on this Plate, is taken from the Peek, instead of the Neck, as the single Line.

Scale
1/8 of an Inch to a Foot

J. Cooke sc. Mill Hill, Midd.x

Pub.d as the Act directs Feb.y 14th 1793. for D. Steel, Bookseller, Tower Hill.

Sloop's Trysail, or Storm Mainsail.



Scale
1/8 of an Inch to a Foot

J. Cooke sc. Mill Hill Middx.
Pubd. as the Act directs Feby. 14th 1793 for D. Steel Bookseller Tower Hill.

SLOOP'S TOPSAIL.

This ſail is quadrilateral, ſquare on the head, and made of canvas No. 6 or 7. It is bent at the head to the topſail yard, extending within 18 inches of the cleats, and hangs to the maſt at right angles with the ſhip's length, and parallel to the croſs-jack-yard. The depth in the middle is one-third of the depth of the croſs-jack, or ſquare-ſail.

From one to two cloths are gored on the leeches, ſufficiently for the foot to ſpread to the cleats on the croſs-jack-yard; and the foot is hollowed from one-third to half of the depth of the ſail in the middle, (on account of the jib-ſtay,) or at the rate of 10 or 12 inches per cloth from the middle to the clue, the middle cloth being left ſquare.

This ſail has one reef-band, 4 inches broad, at about one-third of the depth of the middle-cloth from the head. Pieces, half a yard in length, are put on at each earing; and ſix ſmall pieces, cut out of half a yard of cloth, are put on the leeches, one againſt each bowline-cringle. The pieces are all put on the aftſide.

About three-quarters of an inch of ſlack-cloth ſhould be taken up in every yard in the leeches, half an inch in every cloth in the head, and one inch in every cloth in the foot.

The bolt-rope on the foot and leeches, ſhould be one inch and a half, or two inches, in circumference; and, on the head, one inch, or one inch and a half. The clue-rope ſhould be 2 inches and a half.

Sometimes one reef and three bowline-cringles are made on each leech. The reef-cringles are made at the ends of the reef-band; the upper bowline-cringle in the middle of the leech; and the others equally diſtant from that and the clue.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add together the number of cloths in the head and foot, and halve the ſum, to reduce it ſquare; then multiply the number of ſquare cloths by the depth in the middle, and add the quantity in the foot-gores, bands, and pieces.

To find the quantity in the foot-gores. Add the gores on one ſide of the ſail together, and multiply the ſum by half the number of gored cloths.

EXAMPLE.

$12\frac{1}{2}$ cloths in the head.
15 - - - - - - foot.
———
$\frac{1}{2}$) $27\frac{1}{2}$
———
$13\frac{3}{4}$ ſquare cloths.
$3\frac{1}{2}$ yards deep.
———
$48\frac{1}{8}$ yards.
$12\frac{7}{8}$ - - - in the foot-gore.
3 - - - - - - reef-band, and pieces.
———
Total 64 yards.

Gores on one ſide of the ſail. 2, 4, 6, 9, 12, 15, 18. } Total 66 inches.
66 inches.
7 half the number of gored cloths.
———
Total 462 inches, or $12\frac{7}{8}$ yards, nearly.

SLOOP'S SAVE-ALL TOPSAIL.

This ſail is quadrilateral, ſquare on the head and foot, and made of canvas No. 8. The head is extended by haliards, faſtened to its earing-cringles, in the upper part of the hollow foot of the topſail, and the foot ſpreads the croſs-jack-yard between the clues of the topſail. It is ſeldom uſed but in calm weather.

Two or three cloths only are left ſquare for the head, and the reſt are gored for the leeches. The cloth at each clue is ſo cut as to fall to the foot and form the clue-pieces; and the clues and earings are the ſame as thoſe of other ſmall ſails.

The bolt-rope, on the head, foot, and leeches, ſhould be one inch in circumference.

SLOOP'S GAFF TOPSAIL.

This ſail is quadrilateral, and made of canvas No. 8. The fore-leech is four-fifths of the depth of the fore-leech of the mainſail, and is attached to the topgallant-maſt: the head is bent to a ſmall gaff or yard, by which it is hoiſted to the top-gallantmaſt-head, and the foot ſpreads the gaff of the mainſail. This ſail is only uſed in light breezes.

The depth of the gore on each cloth in the maſt-leech is found, by dividing the depth of the leech by the number of cloths. The head is gored 6 or 8 inches per cloth, and the foot 6 or 8 inches per cloth: ſhort gore to the clue, that the foot may anſwer the peek of the mainſail.

The bolt-rope on the fore-leech ſhould be one inch and a half in circumference; and, on the head, foot, and after-leech, one inch. The clue-rope, when any, ſhould be two inches.

RULE TO FIND THE QUANTITY OF CANVAS IN THE SLOOP'S SAVE-ALL TOPSAIL.

Add together the number of cloths in the head and foot, and halve the ſum, to make it ſquare; then multiply the number of ſquare cloths by the depth, and add the quantity in the clue-pieces.

EXAMPLE FOR THE SAVE-ALL TOPSAIL.

	3	cloths in the head.
	15	- - - - - - foot.
	½) 18	
	9	ſquare cloths.
	1¾	yards deep.
	15¾	yards in the ſail.
	¾	- - - - - - pieces.
Total	16½	yards.

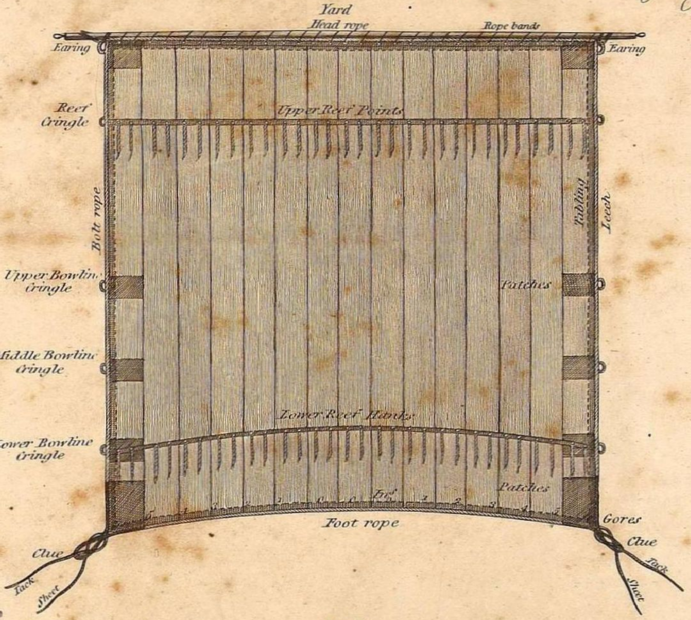
RULE TO FIND THE QUANTITY OF CANVAS IN THE SLOOP'S GAFF TOPSAIL.

Add together the number of cloths in the head and foot, and halve the ſum, to make it ſquare: add the depth of the fore and after-leeches together, and halve the ſame for a medium depth; then multiply the number of ſquare cloths by the medium depth.

EXAMPLE FOR THE GAFF TOPSAIL.

	2	cloths in the head.
	13	- - - - - - foot.
	½) 15	
	7½	ſquare cloths.
	10¼	medium depth.
Total	76⅞	yards.

Sloop's Square Sail. or Cross Jack



Scale
1/8 of an Inch to Foot.

J Cooke sc. Mill Hill Midd.x

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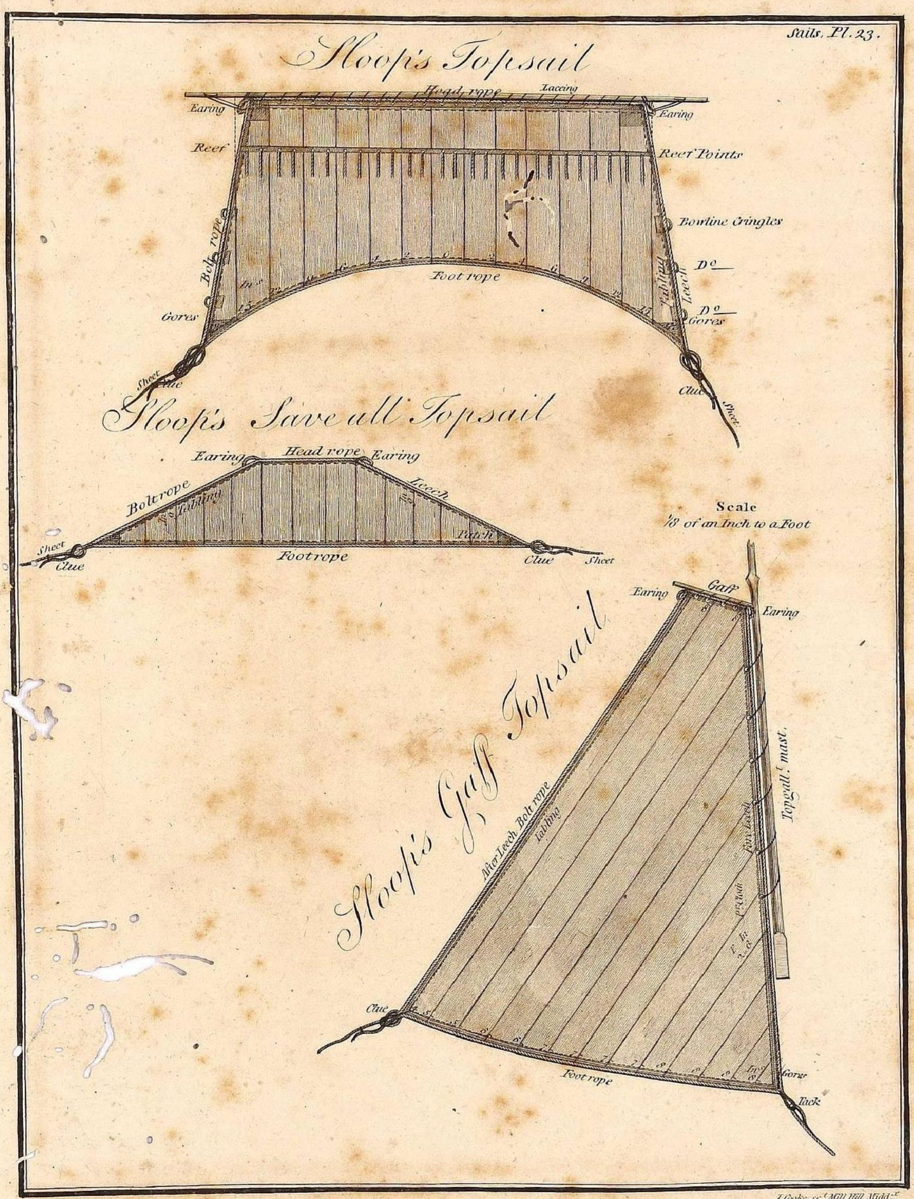

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SLOOP'S TOPGALLANT-SAIL.

This ſail is quadrilateral, cut ſquare on the head and foot, and made of canvas No. 8. It is bent on the head to the topgallant-yard, which hangs above the topſail-yard at right angles with the veſſel's length. The head ſpreads the topgallant-yard, and extends within ſix inches of the cleats; and the foot ſpreads to the cleats on the topſail-yard. This ſail is from 3 to 5 yards deep; or the depth of the leeches of the topſail.

One or more cloths are gored on the leeches; and ſometimes pieces, half a yard in length, are put on the aftſide of the ſail at the clues and earings.

The bolt-rope on the foot and leeches ſhould be one inch in circumference; and on the head three-quarters of an inch, or one inch.

One inch of ſlack-cloth ſhould be taken up with the rope in every cloth in the foot, and three-quarters of an inch in every yard in the leeches.

SLOOP'S WATER-SAIL.

This ſail is quadrilateral, cut ſquare on the head, and made of canvas No. 7. It is occaſionally ſpread under the boom of the main-ſail in fair winds. The leeches are either cut ſquare, or have one gored cloth. The depth of this ſail is from one-half to three-fourths of the length of the boom, and it is 4 or 5 cloths wide.

The bolt-rope, on the head, foot, and leeches, ſhould be one inch and a half in circumference.

*** When ſloops have lower-ſtudding-ſails, they are ſimilar to the water-ſail: the leeches are ſquare, and they are one yard deeper than the leech of the croſs-jack, or ſquare ſail.

Some *ſhips* have a water-ſail, ſimilar to a ſloop's water-ſail.

RULE TO FIND THE QUANTITY OF CANVAS IN THE SLOOP'S TOPGALLANT-SAIL.

Add together the number of cloths in the head and foot, and halve the ſum to make it ſquare; then multiply the number of ſquare cloths by the depth, and add the quantity in the pieces.

EXAMPLE FOR THE TOPGALLANT-SAIL.

11	cloths in the head.
13	- - - - - - foot.
$\frac{1}{2}$) 24	
12	ſquare cloths.
$5\frac{1}{2}$	yards deep.
66	- - - in the ſail.
2	- - - - - - pieces.
Total 68	yards.

RULE TO FIND THE QUANTITY OF CANVAS IN THE SLOOP'S WATER-SAIL.

Multiply the depth of the ſail by the number of ſquare cloths.

EXAMPLE FOR THE WATER-SAIL.

5	number of cloths.
12	yards deep.
Total 60	yards.

SLOOP'S FORE-SAIL.

This ſail is triangular, made of canvas N. 1 or 2; and bends with hanks to the ſtay next before the maſt. The depth of the leech is nearly the ſame as the depth of the fore-moſt-leech of the main-ſail: and there are as many cloths in the foot as will bring it clear of the maſt.

The depth of the hoiſt, or fore-part, divided by the number of gored cloths, gives the length of each gore. The foot has a ſhort gore of one inch per cloth, increaſing to the clue; leaving 1 or 2 ſquare cloths at the tack.

The leech-cloth is left three-quarters of a yard longer than the depth of the leech, for the head-lining, and tabling; and the cloth at the tack is ſo cut as to fall to the foot and form its own lining.

The ſeams ſhould be 3 or 4 inches wide at the foot, and decreaſing to one inch at the hoiſt.

Two reef-bands, 4 inches broad, are generally put on at one-eighth of the depth of the ſail aſunder; the lower one being at that diſtance from the foot. Sometimes a bonnet is uſed inſtead of the lower-reef.

The leech is lined with a breadth of cloth from the clue to half a yard above the upper reef-band, where it is cut half-way acroſs; and, one-half of it being cut away, the other part is ſo continued about one yard higher. Sometimes ſmall triangular pieces are ſewed on at each hole in the hoiſt.

The bolt-rope on the ſtay ſhould be 2 inches and a half or 3 inches in circumference, and on the foot and leech one inch and a half or two inches. The clue-rope ſhould be 3 inches. Three or four inches of ſlack-cloth ſhould be taken up with the rope in every yard in the hoiſt.

The hoiſt-rope is put through the holes in the head-ſtick; then ſerved with ſpunyarn, and ſpliced into the leech-rope. The middle of the head-ſtick, is then ſeized to the head of the ſail; and a thimble is ſeized in the bight of the rope.

Thimbles are generally ſtuck in the cringles at the tack and clue.

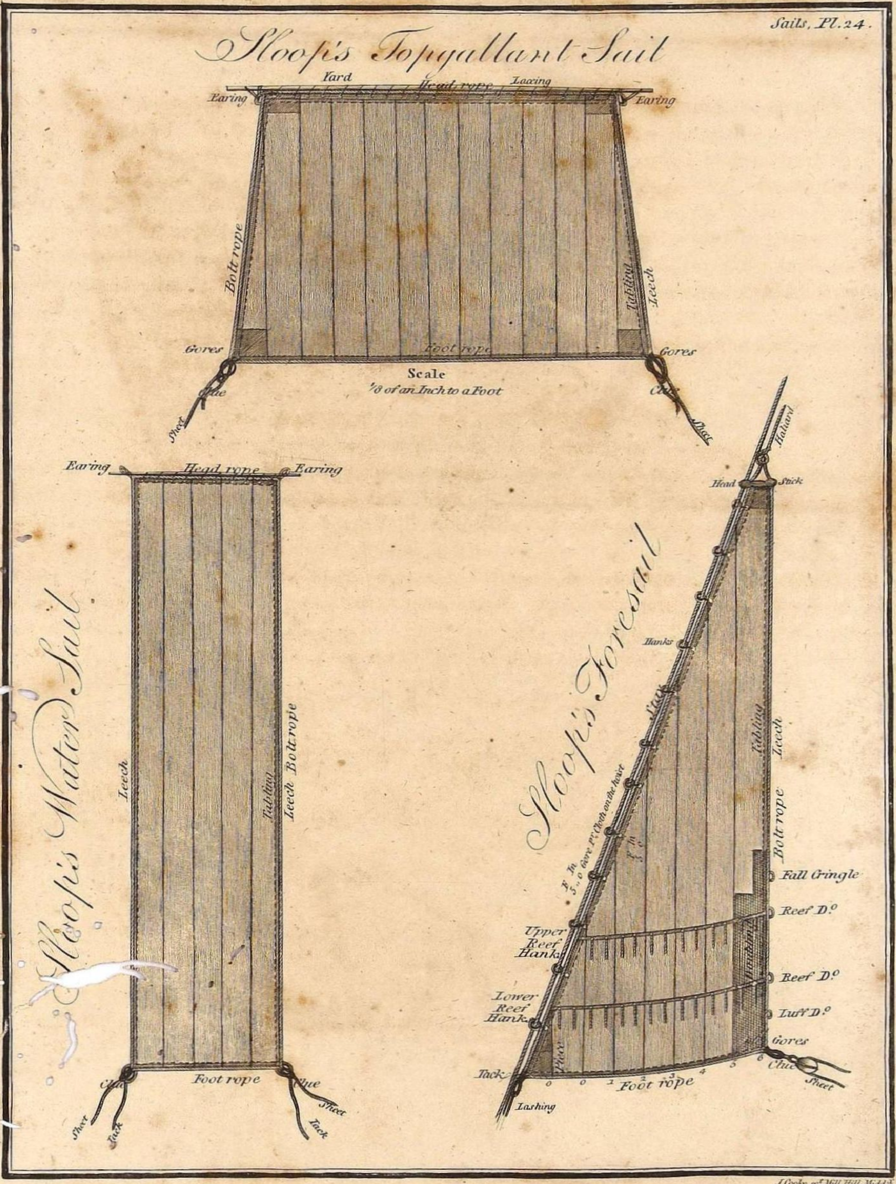
RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Multiply half the number of cloths in the ſail by the depth of the leech, and add the quantity in the foot-gores, bands, and pieces.

To find the quantity in the foot-gores. Multiply the number of cloths by the depth of the gores when added together; and five-eighths of the product is the anſwer.

EXAMPLE.

	4 half the number of cloths.		Gores. 1, 2, 3, 4, 5, 6, } Total, 21 inches.
	$11\frac{1}{2}$ yards: depth of the leech.		21 inches.
	46 yards.		8 number of cloths.
	3 yards in the foot-gores.		$\frac{5}{8}$) 168
	$6\frac{1}{2}$ - - - - - - bands and pieces.		
Total	$55\frac{1}{2}$ yards.		105 inches; or 3 yards, nearly.



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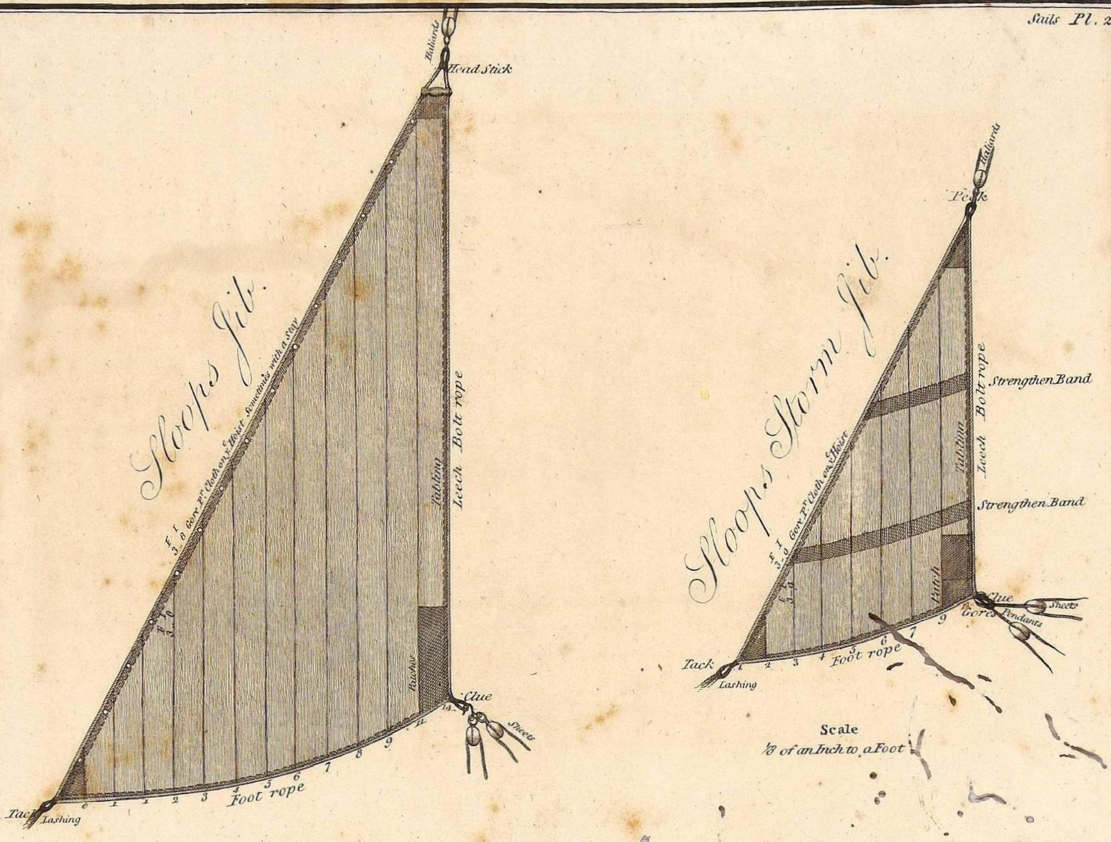

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SLOOP'S JIB.

This ſail is triangular, made of canvas No. 2 to 6, and is ſometimes bent to hanks on the ſtay before the fore-ſail. The depth of the leech is one yard for every cloth in the foot, and the foot is made wide enough to ſpread the bowſprit.

The depth of the hoiſt, or fore-part, divided by the number of cloths gored, gives the length of each gore. The foot is gored with a ſweep, at the rate of 5 to 6 inches per cloth, encreaſing to the clue; leaving one ſquare cloth at the tack.

The leech-cloth is left three quarters of a yard longer than the depth of the leech, for the head-lining and tabling; the cloth at the tack is cut ſo as to fall to the foot and form its own lining; and the clue-piece is two yards in length.

The ſeams on the foot ſhould be 3 or 4 inches broad, and ſhould decreaſe to one full inch on the hoiſt.

If hoiſted with a ſtay, the rope on the hoiſt ſhould be 2 inches and a half or 3 inches in circumference; but if not hoiſted with a ſtay, the rope on the hoiſt ſhould be 5 inches. The rope on the foot and leeches ſhould be 2 inches and a half, and the clue-rope 3 inches.

Four or five inches of ſlack-cloth ſhould be taken up in every yard in the hoiſt, when ropeing, and the rope on the hoiſt put through the holes in the head-ſtick; then ſerved with ſpunyarn, and ſpliced into the leech-rope. The head-ſtick is ſeized round the middle to the head of the ſail, and a thimble ſeized in the bight of the rope.

Thimbles are generally ſtuck in the cringles at the tack and clue. This ſail ſometimes has a bonnet.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Multiply half the number of cloths in the ſail by the depth of the leech, and add the quantity in the foot-gores and pieces.

To find the quantity in the foot-gores. Multiply the number of cloths by the depth of the gores when added together; and five-eights of the product is the anſwer.

EXAMPLE.

$6\frac{1}{2}$ half the number of cloths.
$12\frac{1}{4}$ yards; depth of the leech.

$79\frac{5}{8}$ yards.
16 yards in the foot-gores.
$3\frac{3}{8}$ - - - - - pieces.

Total 99 yards.

inches in each gore.
1, 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 14. } Total 71 inch.
71 inches.
13 number of cloths.

$\frac{5}{8}$) 923

576 inches, or 16 yards.

Note. The ſloop's ſecond jib is ſeven-eighths of the ſize of the firſt jib; and the third jib is three-fourths of the ſize of the firſt jib: but they are both made like the firſt jib, as above.

SLOOP'S STORM JIB.

This ſail is triangular, and made of canvas No. 1 or 2. It is two-thirds of the ſize of the firſt jib, and is uſed in ſtormy weather, in lieu of a larger one.

The depth of the hoiſt, divided by the number of gored cloths in it, gives the length of each gore. The foot is gored at the rate of 5 or 6 inches per cloth, encreaſing to the clue.

The ſeams ſhould be 3 or 4 inches broad at the foot, and ſhould decreaſe to one inch on the hoiſt. The bolt-rope on the hoiſt, ſhould be 5 inches in circumference, and on the foot and leech 2 inches and a half. The clue-rope ſhould be 3 inches.

Two ſtrengthening bands of half a breadth of cloth are put on, parallel to the foot, at one-third of the depth of the ſail aſunder. The clue is lined with a breadth of cloth one yard and a half in length; a piece, one yard long, is put on at the peek; and the cloth at the tack is ſo cut as to fall to the foot and form its own lining. Thimbles are ſometimes ſeized in the peek, tack, and clue.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Multiply half the number of cloths in the ſail by the depth of the leech, and add the quantity in the bands, and pieces.

To find the quantity in the foot-gores. Multiply the number of cloths by the depth of the gores when added together; and five-eighths of the product is the anſwer.

EXAMPLE.

	4 half the number of cloths.		inches in each gore. 2, 3, 4, 5, 6, 7, 9, 12. } Total 48 inches.
	8 yards deep.		48 inches.
	32 yards.		8 number of cloths.
	$6\frac{3}{4}$ - - - in the foot-gores.		
	6 - - - - - - bands and pieces.		$\frac{5}{8}$) 384
Total	44 yards.	Total	240 inches, or 6 yards & 3-quarters, nearly.

SLOOP'S FLYING JIB.

This ſail is triangular, made of canvas No. 6, and is two thirds of the ſize of the firſt jib. It is the foremoſt ſail, and hoiſts without a ſtay.

The depth of the hoiſt, or fore-part, divided by the number of cloths, gives the length of each gore. The foot is gored with a ſweep, at the rate of 8 or 9 inches per cloth, encreaſing to the clue.

The piece at the clue is one yard and a half in length; that at the peek is one yard; and the cloth at the tack is ſo cut as to fall to the foot and form its own lining.

The ſeams ſhould be two inches and a half broad at the foot, and ſhould decreaſe to one inch at the hoiſt. The rope on the hoiſt ſhould be 3 inches and a half in circumference; on the foot, two inches; and on the leech one inch. Three inches of ſlack-cloth ſhould be taken up with the rope in every yard in the hoiſt. Thimbles are ſometimes ſpliced in the tack, peek, and clue.

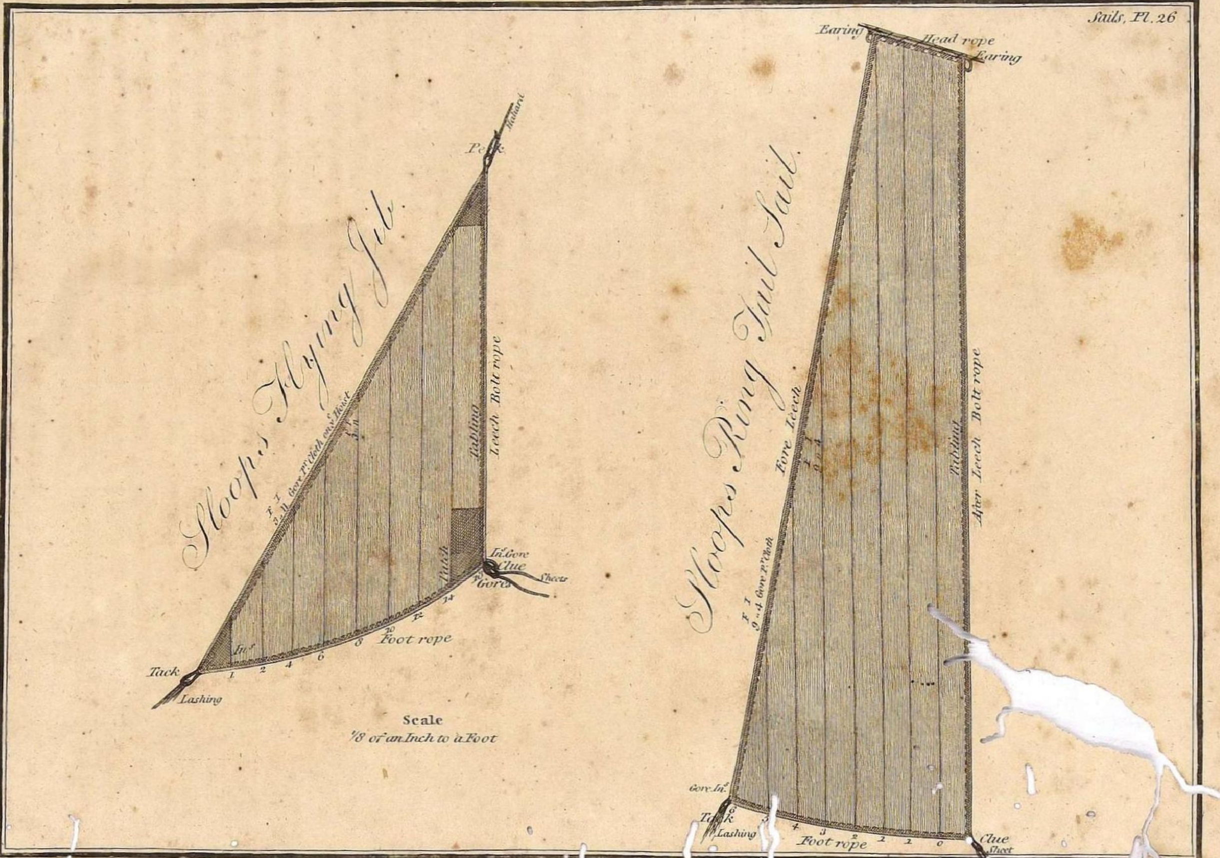
RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Multiply half the number cloths in the ſail by the depth of the leech, and add the quantity in the pieces.

To find the quantity in the foot gores. Multiply the number of cloths by the depth of the gores when added together; and five-eighths of the product is the anſwer.

EXAMPLE.

	$4\frac{1}{2}$ half the number of cloths.		inches in each gore. 1, 2, 4, 6, 8, 10, 12, 14, 18. } Total 75 inches.
	8 yards deep.		75 inches.
	36 yards.		9
	$11\frac{1}{4}$ - - - in the foot gores.		
	3 - - - - - - pieces.		$\frac{5}{8}$) 675
Total	$50\frac{1}{4}$ yards.	Total	422 inches, or 11 yards and $\frac{3}{4}$, nearly.



Pub.d as the Act directs. Feb.y 14.th 1793. for D. Steel Bookseller. Tower Hill.

SLOOP'S RINGTAIL SAIL.

This fail is quadrilateral, and made of canvas No. 7, or 8. It is occafionally hoifted abaft the after-leech of the main fail, to which the fore-leech is made to anfwer. The head is bent to a fmall yard at the outer end of the gaff; and the foot is fpread on the boom, which is prolonged by a piece lafhed to the outer end.

The depth of the fore-leech, being divided by the number of cloths in it, gives the length of the gore on each cloth. The head has a regular gore to anfwer the peek of the mainfail, and the foot is gored with a gore of one inch per cloth, encreafing to the tack.

The bolt-rope on the head, foot, and after-leech, fhould be one inch in circumference; and on the fore-leech, one inch and a half.

*** A fail of this kind, but more fquare, is fometimes extended in light winds, on a fmall maft, erected for that purpofe on the upper part of the ftern of fome veffels; the foot being fpread out by a boom that projects horizontally from the ftern.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add together the number of cloths in the head and foot, and halve the fum to make it fquare: add the depth of the leeches together, and halve the fum for a medium depth, which multiplied by the number of fquare cloths gives the anfwer.

EXAMPLE.

	3	cloths in the head.
	8	- - - - - - -foot.
	½) 11	
	5½	fquare cloths.
	16	yards, medium depth.
Total	88	yards.

SMACK'S MAINSAIL.

This ſail is quadrilateral, and made of canvas No. 1 or 2. The fore-leech is nearly of the depth of the maſt from the under part of the hounds to the boom, and is attached to hoops which enc[illegible]cle the maſt. The after-leech is about one-fifth deeper than the fore-leech. The head is [illegible] to the gaff, and ſpreads within 12 inches of the cleats at the outer-end; and the foot is ſpread upon the boom, extending within 18 inches of the ſheave-hole at the outer-end of it.

The depth of the fore-leech, divided by the number of cloths to the maſt, gives the length of the regular gore per cloth; but, if cut with a ſweep, the gores muſt be regulated by judgement. The head is gored at the rate of 4 or 5 inches per cloth; and the foot with a circular ſweep at the rate of 12 or 14 inches per cloth, for every cloth in the maſt-leech, it having a ſhort gore to the clue on 5 or 6 cloths, at the rate of 3 or 4 inches per cloth.

The fore-leech is lined with a breadth of cloth from the tack to the nock; and the after-leech is lined with a breadth of cloth from the clue to 2 yards above the upper reef-band, where it is cut half way acroſs; and, one part being cut away, the other is ſo continued about one yard higher. The peek is lined with a piece one yard and a half in length.

The ſeams ſhould be 4 inches broad 9 feet up from the foot, and 2 inches broad 6 feet down the ſeam from the head, the remainder of the ſeam ſhould be one inch broad.

Four reef-bands, from 6 to 8 inches broad, are put on parallel with the foot; the upper one is at three-ſevenths of the depth of the fore-leech from the foot, and the others are at equal diſtances from the upper-one. Sometimes a balance-reef is put on from the nock to the upper reef-cringle on the after-leech.

The bolt-rope on the maſt-leech ſhould be 3 inches in circumference, and on the head, foot, and after-leech, one inch and a half. The clue-rope ſhould be 4 inches. And 4 inches of ſlack-cloth ſhould be taken up with the rope in every yard in the maſt-leech.

Iron thimbles, are ſtuck in the cringles at the tack, nock, peek, and clue; in cringles made on each leech, at the ends of the reef-bands; and in a lu[illegible]-cringle made on the fore-leech between the lower reef-cringle and the tack.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add together the number of cloths in the head and foot, and halve the ſum to make it ſquare: add the depth of the fore and [illegible] leeches together, and halve the product for a medium depth: then multiply the number of ſquare cloths, by the medi[illegible], and add the quantity in the bands and pieces.

To find the quantity of canvas in the foot-gores. Add together the gores from the tack to the firſt ſquare cloth in the foot, and multiply half the ſum by the number of cloths in the foot: then add together the gores from the clue to the firſt ſquare cloth, and multiply half the ſum by the number of cloths gored to the clue; which, ſubtracted from the product of the gores to the tack, gives the anſwer.

EXAMPLE.

15 cloths in the head.
25 - - - - - - -foot.

$\frac{1}{2}$) 40

20 ſquare cloths.
16 yards: medium depth.

320 yards.
$46\frac{1}{8}$ yards in the foot gores.
46 - - - - - - linings and pieces.

Total $412\frac{3}{4}$ yards.

Gores to the tack. 22, 19, 17, 15, 13, 11, 9, 7, 6, 5, 4, 3, 2, 2, 1, 1, 1. } Total 138 inches.

$\frac{1}{2}$) 138

69 inches.
25 number of cloths in [illegible] foot.

1725

Gores to the clue. 1, 2, 4, 6, 9. } Total 22 inches.

$\frac{1}{2}$) 22

11 inches.
5 cloths gored to the clue.

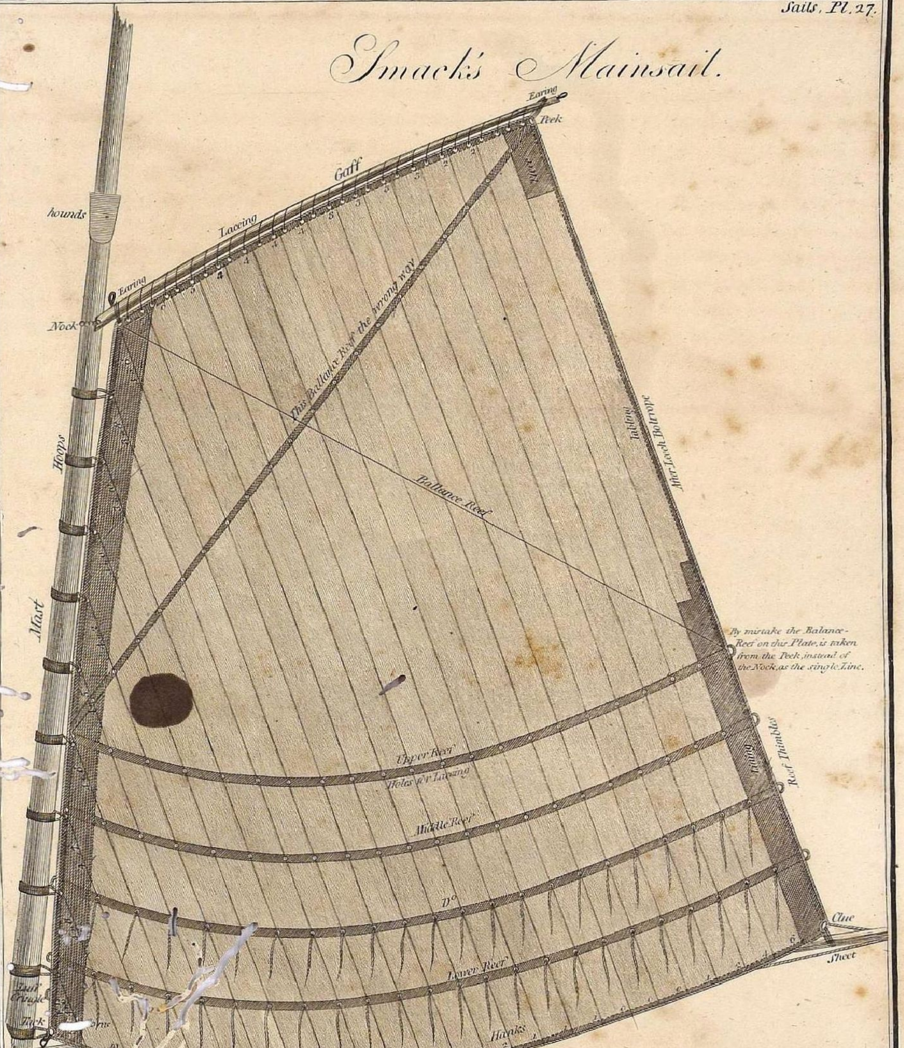
55 inches.

[illegible]nches.
[illegible]725 in the tack-go[illegible].
[illegible]55 in the clue-gores.

To[illegible]6[illegible] inch. or $46\frac{3}{8}$ y[illegible].

Sails, Pl. 27.

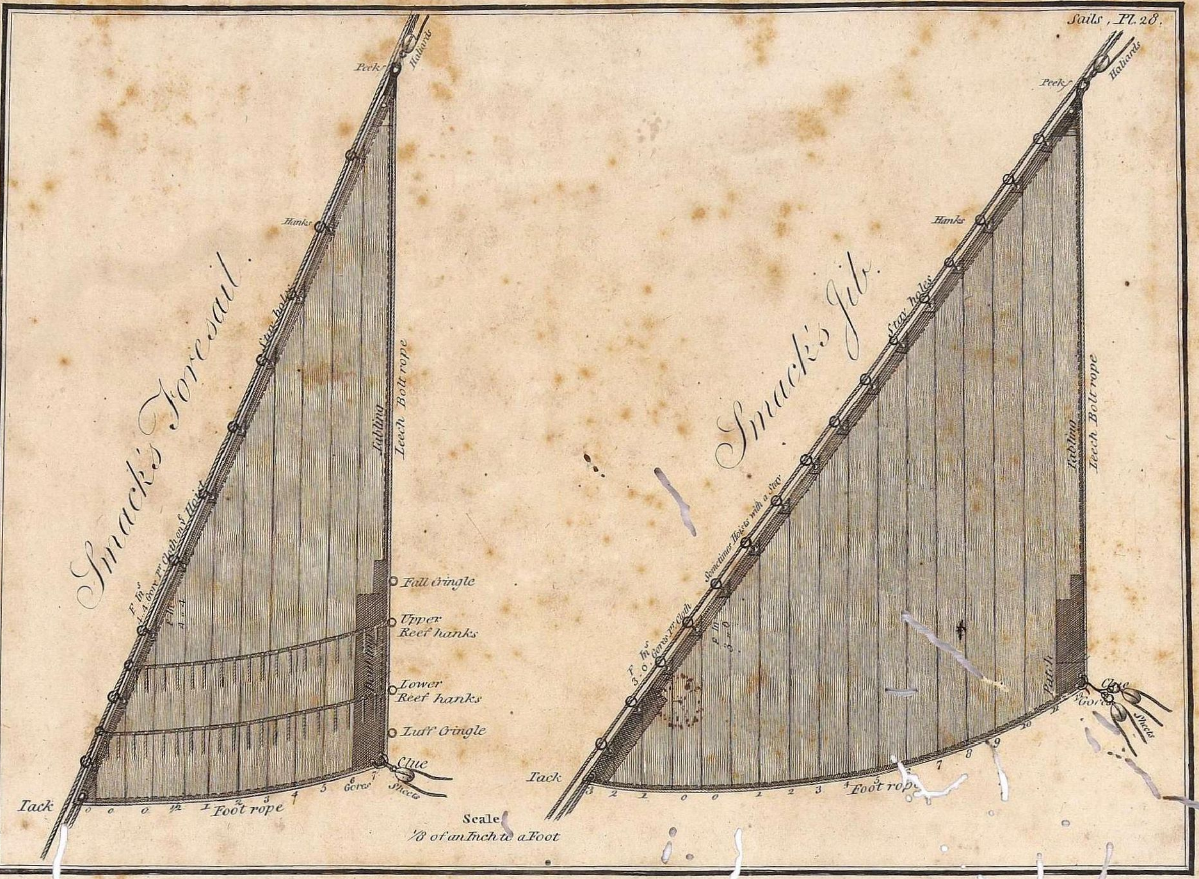
Smack's Mainsail.



Scale
1/8 of an Inch to a Foot

J. Cooke sc. Mill Hill Midd.x

Pub.d as the Act directs Feb.y 24th 1793 for D. Steel, Bookseller, Tower Hill.



Pub. as the Act directs Feb.y 14th 1793 for D. Steel Bookseller Tower Hill

SMACK'S FORESAIL.

This sail is triangular, made of canvas No. 1 or 2, and bends with hanks to the ftay next before the maft. The leech is of the fame depth as the fore-leech of the mainfail, and there are as many cloths in the foot as will keep clear of the maft.

The depth of the hoift, divided by the number of cloths, gives the length of the gore on each cloth. The foot is gored with a fhort gore, encreafing to the clue of one inch per cloth, leaving two or three fquare cloths at the tack.

The leech-cloth is cut fquare at the upper end, and is fo doubled as to form its own lining. The cloth at the tack is cut in the fame manner. The leech is lined with a breadth of cloth from the clue to one yard and a half above the upper reef-band, where it is cut half acrofs; and one part being cut away, the other part is fo continued about one yard higher. A broad tabling is generally made on the hoift, but fometimes fmall triangular pieces are put on at each hole inftead of it.

The feams fhould be 3 or 4 inches wide at the foot, and to decreafe to one full inch at the hoift.

Two reef-bands, 4 inches broad, are fometimes put on parallel to the foot, at about one-ninth of the depth of the leech, afunder; but a bonnet is more frequently ufed to this fail.

The bolt-rope on the ftay fhould be 2 inches and a half, or 3 inches in circumference, and on the foot and leech, one inch and a half or 2 inches. The clue-rope fhould be 2 inches and a half or 3 inches. Three or four inches of flack-cloth fhould be taken up with the rope in every yard in the hoift.

Iron thimbles are generally ftuck in the cringles at the tack and clue, and in the bight of the rope at the peek. Sometimes this fail has a head-ftick.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Multiply the depth of the leech by half the number of cloths in the fail, and add the quantity in the foot-gores, bands, and linings. *To find the quantity in the foot gores.* Add together the gores on each cloth; multiply the fum by the number of cloths in the fail, and five-eighths of the product is the anfwer.

EXAMPLE.

$14\frac{1}{2}$ yards: depth of the leech.
$5\frac{1}{2}$ half the number of cloths.

$79\frac{3}{4}$ yards.
$5\frac{1}{2}$ - - - in the foot-gores.
7 - - - - - - - bands and linings.

Total $92\frac{1}{4}$ yards.

Gores on each cloth.
$\frac{1}{2}$, 1, 2, 3, 4, 5, 6, 7. } Total $28\frac{1}{2}$ inches.
$28\frac{1}{2}$ inches.
11 number of cloths.

$\frac{5}{8}$) $313\frac{1}{2}$

Total 198 inches, or 5 yards and a half.

SMACK'S JIB.

This ſail is triangular, made of canvas No. 1 or 2, and generally hoiſts by haliards, without a ſtay, next before the fore-ſail. The foot is made to ſpread the bowſprit, and the depth of the leech is from three-quarters of a yard to one yard for every cloth in the foot.

The depth of the hoiſt, or fore part, divided by the number of cloths, gives the length of each gore. The fourth and fifth cloths from the tack are cut ſquare on the foot, and the cloths each way from them are gored with a ſweep, at one inch per cloth, encreaſing to the tack and clue.

The upper end of the leech-cloth is cut ſquare, and is doubled back to form its own lining. The tack and clue are lined with a breadth of cloth two yards in length. When this ſail is made to hoiſt with a ſtay, it either has ſmall triangular pieces put on at each hole in the hoiſt, or a broad tabling.

The ſeams ſhould be 3 or 4 inches wide at the foot, and to decreaſe to one full inch at the hoiſt.

The rope on the ſtay ſhould be 5 inches in circumference, and that on the foot and leech, 2 inches. Four or five inches of ſlack-cloth ſhould be taken up with the rope in every yard in the hoiſt.

Thimbles are ſtuck in the cringles at the tack and clue; and one is ſeized in the bight of the rope at the peek, which is ſeized with ſpunyarn. This ſail ſometimes has a head-ſtick.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Multiply the depth of the leech by half the number of cloths in the ſail; and add the quantity in the foot-gores, and pieces.

To find the quantity in the foot-gores. Add together the gores on each cloth to the clue; multiply the ſum by the number of cloths in the ſail, and five-eighths of that product is the anſwer.

EXAMPLE.

12 yards: depth of the leech.
$8\frac{1}{2}$ half the number of cloths.

102 yards.
23 - - - in the foot-gores.
5 - - - - - - pieces.

Total 130 yards.

Gores on each cloth to the clue. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12. } Total 78 inches.
78 inches.
17 number of cloths.

$\frac{5}{8}$) 1326

Total 828 inches, or 23 yards.

THE FOLLOWING SAILS ARE SOMETIMES, THOUGH BUT VERY SELDOM, USED, AND ARE NOT USUALLY MADE IN THE GENERAL PRACTICE.

SKY-SCRAPERS. Thefe fails are triangular, and made of canvas No. 8. The foot fpreads half of the royal-yards, and each fail has half the number of cloths in the foot, as are in the head of its refpective royal-fail. The peek is hoifted by a haliard to the truck on the maft-head. To find the quantity of canvas: multiply half the number of cloths by the depth.

ROYAL STAYSAILS are quadrilateral, and made of canvas No. 8. They are the fame as a top-gallant-ftayfail, only with one or two cloths lefs, and are hoifted next above them. The rule for finding the quantity of canvas is the fame as that for the topgallant-ftayfails.

STORM MIZEN. This fail is triangular, and fimilar to a fore-topmaft-ftayfail. It is made of canvas No. 2 or 3, and bends on the fore part to a horfe, abaft and parallel to the mizen-maft. The foot is extended towards the taffarel by a fheet. To find the quantity of canvas, multiply half the number of cloths by the depth.

SPRITSAIL-TOPGALLANT-SAIL is quadrilateral, cut fquare on the head, and is fimilar to the fpritfail-topfail. It is made of canvas No. 8, and is bent on the head, to the fpritfail-topgallant-fail-yard, which hangs at right angles under the outer end of the jib-boom. The foot fpreads the fpritfail-topfail-yard, and contains the fame number of cloths in it as the head of the fpritfail-topfail. One or two cloths are gored on each leech. The rule to find the quantity of canvas is the fame as that for the fpritfail-topfail.

WINGSAIL FOR KETCHES. This fail is quadrilateral, and fimilar to the mizen-courfe of a fhip. It is made of canvas No. 6 or 7, and bends abaft the main-maft to hoops which encircle the maft. The head is extended by a gaff. The rule to find the quantity of canvas is the fame as that for the mizen-courfe of a fhip.

BOAT'S SETTEE SAIL.

This ſail is quadrilateral, and made of canvas No. 7 or 8. The head is bent to a latteen-yard, which hangs obliquely to the maſt at one-third of its length, and extends within 6 inches of the cleats.

The cloth at the tack is cut goring to the nock, and the bunt is of the depth of the reef; which is one-fifth of the depth of the leech. The leech is five-ſixths of the length of the head.

The length of the head, divided by the number of cloths in it, gives the length of each gore. The foot is cut with a circular ſweep, after the ſail is ſewed together.

Two ſmall holes are made in each cloth along the head; and holes are made acroſs the ſail, on each ſeam, at one-fifth of the depth of the leech from the foot, for the reef. A ſmall reef-cringle is made on the after-leech-rope, and cringles are made at the nock and peek.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add together the number of cloths in the head and foot, and halve the ſum to reduce it ſquare: add the depth of the bunt and depth of the leech together, and halve the ſum for a medium depth; which, multiplied by half the number of ſquare cloths, gives the anſwer.

EXAMPLE.

	7	yards; medium depth.
	$5\frac{1}{2}$	half the number of cloths.
Total	73	yards.

BOAT'S LATTEEN SAIL.

This ſail is triangular, and made of canvas No. 7 or 8. It is ſo called from its head being bent to the latteen-yard, which hangs obliquely to the maſt at one-third of its length, extending within 6 inches of the cleats.

The length of the head, divided by the number of cloths, gives the length of the gore on each cloth. The foot is cut ſquare.

Two ſmall holes are made in each cloth along the head, through which the lacings are reeved.

*** This ſail, when the head of it (then called the fore-leech) is laced to a maſt and topmaſt, is called a ſliding-gunter-ſail; the topmaſt being made to ſlide down the maſt by means of hoops.

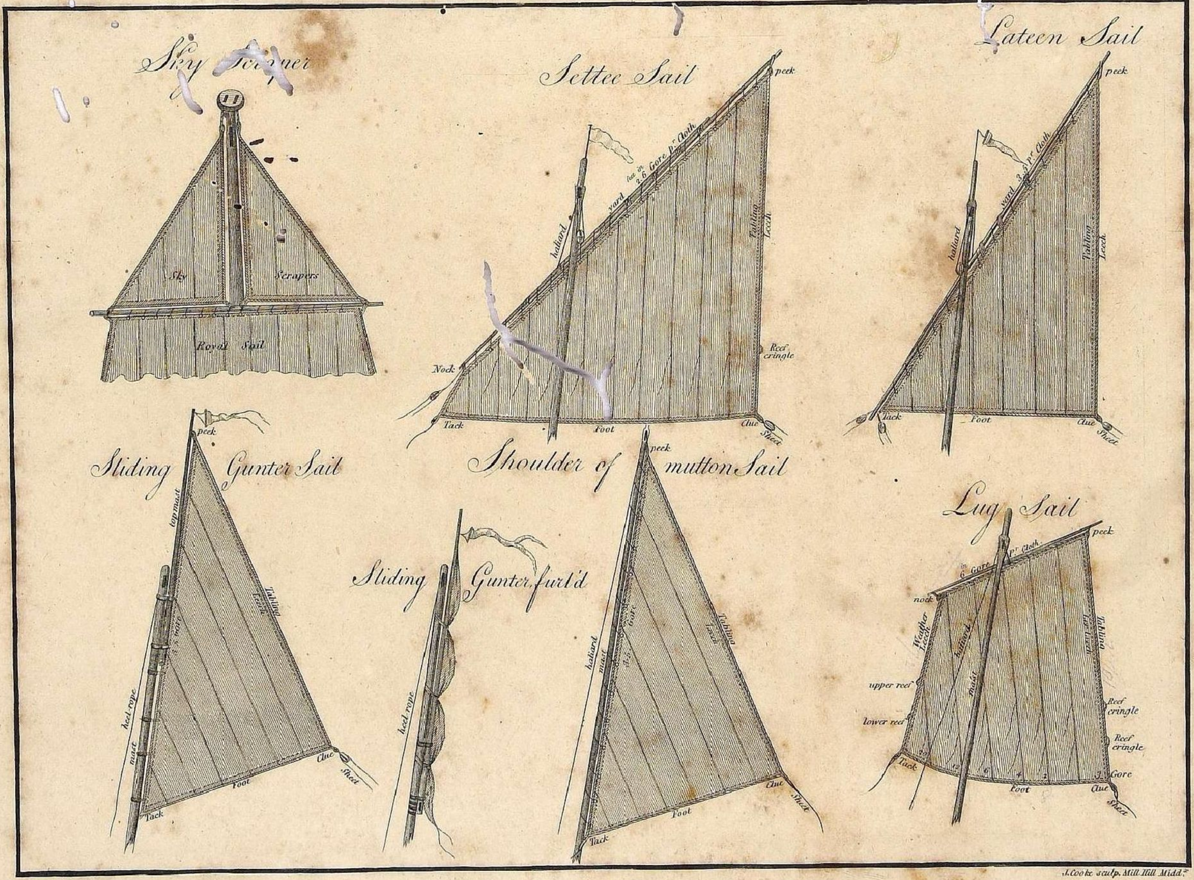
It is likewiſe called a ſhoulder-of-mutton-ſail, when laced by the fore-leech to a ſingle maſt.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Multiply half the number of cloths by the length of the head.

EXAMPLE.

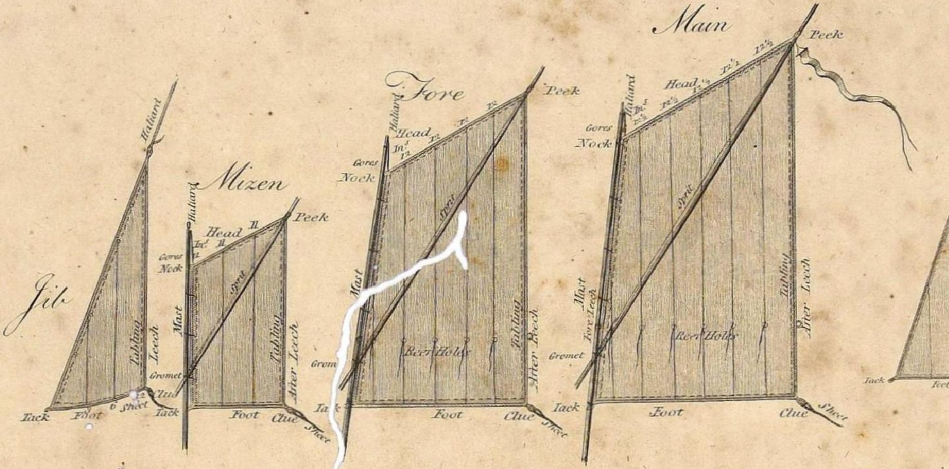
	$3\frac{1}{2}$	half the number of cloths.
	$6\frac{1}{2}$	yards; length of the head.
Total	$22\frac{3}{4}$	yards.



J. Cooke sculp. Mill Hill Midd^x

Published as the Act directs, for D. Sted, Bookseller Tower Hill, Feby 14th 1794.

Boat's Sprit Sails and Jib



Scale
1/8 of an Inch to a Foot

Pub.d as the Act directs Feb.y 14.th 1793 for D. Steel Bookseller, Tower Hill.

BOAT'S LUG SAIL.

This ſail is quadrilateral, and made of canvas No. 7 or 8. The head is bent to a yard, which hangs obliquely to the maſt at one third of its length, and extends within 4 inches of the cleats. Two or three cloths are gored on the fore-leech, and an even gore of 6 inches per cloth is made on the head. The foot is gored with a ſweep; the cloth at the clue being cut with a 3-inch ſhort gore, the next cloth is ſquare, and the cloths from thence to the tack are gored at the rate of 6 or 8 inches per cloth.

The fore-leech is as deep as the length of the head, and the after-leech is longer than the fore-leech by nearly half the depth of the fore-leech.

Two ſmall holes are made in each cloth in the head.

This ſail has two reefs parallel with the foot, the upper one is half way up the fore-leech, and the other is equally diſtant from that and the foot. Sometimes reef-bands 3 or 4 inches broad are put on at the reefs, but when theſe are not uſed, a ſmall hole is made in every ſeam inſtead of them.

Small cringles are made on the leeches at each reef; earing-cringles are made at the nock and peek; and 10 or 12 ſtrands in the length of the rope are ſeized at the tack and clue.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Add together the number of cloths in the head and foot, and halve the ſum to make it ſquare: add the depth of the leeches together, and halve the ſum for a medium depth: then multiply the number of ſquare cloths by the medium depth, and add the quantity in the foot-gores and reef-bands.

To find the quantity in the foot-gores. Multiply the number of gored cloths to the tack by the foot-gore on the cloth next the tack.

EXAMPLE.

	6	ſquare cloths.
	4	yards: medium depth.
	24	yards.
	$3\frac{1}{4}$	- - - in the foot-gore.
	1	- - - - - reef-bands.
Total	$28\frac{1}{4}$	yards.

	5	number of cloths gored to the tack.
	20	inches: gore on the cloth next the tack.
Total	100	inches, or 3 yards and a quarter, nearly.

BOAT'S SPRITSAILS.

Thefe fails are quadrilateral, and made of canvas No. 7 or 8, the fore-leeches are attached to their refpective mafts by lacings, reeved through holes made in them; and the heads are elevated and extended by fprits, or fmall yards, that crofs the fail diagonally from the maft to the peek; the lower end of the fprit, refts in a wreath or collar of rope called a fnotter, which encircles the maft at the foot of the fail.

The fore-leeches of the main and fore fprit-fails are the depth of the maft within 12 inches of the gunwale, and have one or two gored-cloths. The heads of them have an even gore of 12 or 14 inches per cloth.

The fore-leech of the mizen fprit-fail is the depth of the maft, fo as to clear the gunwale; and is fquare. The head has an even gore of 11 inches per cloth.

Small holes are made in the fore-leeches: thofe in the main and fore fprit-fails are one yard, and thofe in the mizen are three-quarters of a yard afunder. Holes are alfo made in the feams, acrofs the fail, at one-fifth of the depth of the after-leech from the foot, for the reef.

Ten or 12 turns or twifts of the ftrands in the length of the rope is feized, to form bights, at the tack, nock, peek, and clue.

RULE TO FIND THE QUANTITY OF CANVAS IN SPRITSAILS.

Add together the number of cloths in the head and foot, and halve the fum to make it fquare: add the depth of the leeches together, and halve the fum for a medium depth; then multiply the number of fquare cloths by the medium depth.

EXAMPLES.

MAIN-SPRITSAIL	FORE-SPRITSAIL	MIZEN-SPRITSAIL.
6 fquare cloths.	5 fquare cloths.	3 cloths.
$6\frac{1}{4}$ medium depth.	$5\frac{1}{2}$ medium depth.	$3\frac{1}{4}$ medium depth.
Total $37\frac{1}{2}$ yards.	Total $27\frac{1}{2}$ yards.	Total $9\frac{3}{4}$ yards.

BOAT'S FORESAIL.

This fail is triangular, and made of canvas No. 8. The leech is of the fame depth as the fore-leech of the fore-fpritfail, and the foot is made wide enough to fpread from the ftem to the maft.

The depth of the fore-part, or hoift, divided by the number of cloths, gives the length of each gore. The foot is cut fquare.

Two inches of flack-cloth fhould be taken up with the rope in every yard in the depth of the hoift.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Multiply half the number of cloths in the fail by the depth of the leech.

EXAMPLE.

$1\frac{1}{2}$ half the number of cloths.
5 yards: depth of the leech.

Total $7\frac{1}{2}$ yards.

BOAT'S JIB.

This ſail is triangular, and made of canvas No. 8. The leech is of the ſame depth as the leech of the fore-ſail, and the foot is as wide as the length of the bowſprit.

The depth of the fore part, or hoiſt, divided by the number of cloths, gives the length of each gore. The foot is cut with a ſweep, at the rate of 6 or 7 inches per cloth, with a ſhort gore to the clue.

Two inches of ſlack-cloth ſhould be taken up with the rope in every yard in the hoiſt.

RULE TO FIND THE QUANTITY OF CANVAS IN THIS SAIL.

Multiply half the number of cloths by the depth of the leech.

To find the quantity in the foot-gores. Multiply the gores, when added together, by the number of cloths; and five-eighths of the product is the anſwer.

EXAMPLE.

$1\frac{1}{2}$ half the number of cloths.
$4\frac{1}{2}$ yards: depth of the leech.

$6\frac{3}{4}$ yards.
$1\frac{3}{4}$ - - - in the foot-gores.

Total $8\frac{1}{2}$ yards.

Gores.

3
6 } inches.
12

21 inches.
3 number of cloths.

Total 63 inches, or one yard and three-quarters.

OBSERVATIONS.

In order to ſtrengthen ſails, it has been recommended to have the holes in the heads and reefs placed thus: one hole to be made in the ſeam, another in the middle of the canvas, and ſo on alternately; the hole in the ſeam to be half an inch lower than the hole in the middle of the canvas. By this the ſtrain would lie upon the holes in the ſeam, which are more capable of bearing it than thoſe holes which are in the ſingle canvas.

It is likewiſe recommended to cut theſe holes with a hollow punch, inſtead of making them with a ſtabber or pricker

AWNINGS.

Awnings are made of canvas No. 1 or 2. The length of the main-deck awning is from the cen[tre] of the fore-maſt to the centre of the main-maſt. The width is ſhaped agreeably to the breadths [of] the ſhip, taken at the main-maſt, the fore-maſt, and at the midway between.

The length of the quarter-deck awning is from the centre of the main-maſt to the centre of the mizen-maſt. The width is ſhaped agreeably to the breadths of the ſhip, taken at the main-maſt, the mizen-maſt, and at the midway between.

The length of the poop or after-awning is from the centre of the mizen-maſt to the enſign-ſtaff, about ſeven feet above the deck. The width is ſhaped agreeably to the breadths of the ſhip, taken at the mizen-maſt, the taffarel, and at the midway between.

Veſſels in harbour, particularly in the royal navy, have uprights, (inſtead of maſts); one fixed at the break of the quarter-deck, one at the forecaſtle, and one at the knightheads forward. The lengths and breadths are taken as before, only at thoſe uprights inſtead of at the maſts.

The canvas is cut out to the given breadths of the awning, allowing about nine inches to hang down on each ſide, which is ſometimes ſcolloped and bound with green baize, and is ſewed together with an inch ſeam, and tabled all round with a two or three inch tabling. Half the diameter of the maſts is cut out in the middle at each end, and lacing-holes are made acroſs the ends to connect one awning to another.

On the upper part, along the middle and ſides, is ſewed one inch and half or two inch rope, to which the trucks are ſewed at about three-quarters of a yard aſunder. A thimble is ſpliced in each end of the rope.

Sometimes curtains are made to hang to the ſides of the awnings, of the ſame length as the awnings. Their depth is taken from the ſides of the awning to the gunwale, ſuppoſing the awning to be in its place. The ſeams and tablings are the ſame as thoſe of the awnings, and lacing-holes are made along the upper tabling of the curtain, and the ſide tabling of the awning.

RULE TO FIND THE QUANTITY OF CANVAS IN AWNINGS.

Multiply the number of cloths by the medium breadth. The medium breadth is found by adding together the three breadths, an[d] dividing the ſum by three.

To find the quantity in the curtains. Multiply the number of cloths by the length.

EXAMPLE.

FOR AWNINGS.

Main-deck awning.
24 number of cloths.
9 yards; medium breadth.
Total 216 yards.

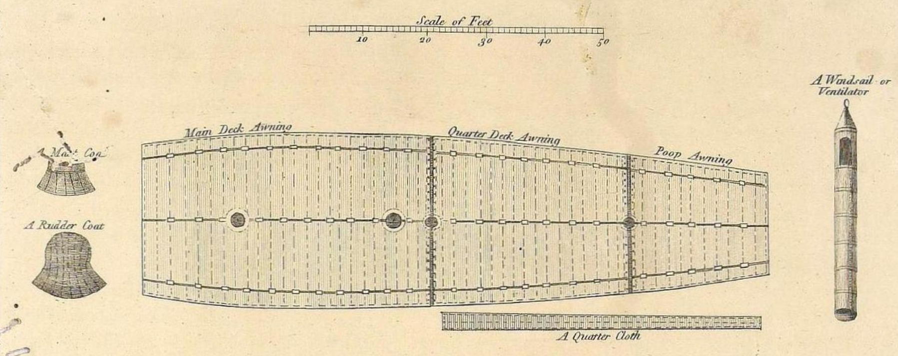
FOR THE MEDIUM BREADTH.

Breadth at main-maſt.	9
- - - - - -fore-maſt.	8
- - - - - -midway bet.	10
3)	27
medium breadth.	9 yards.

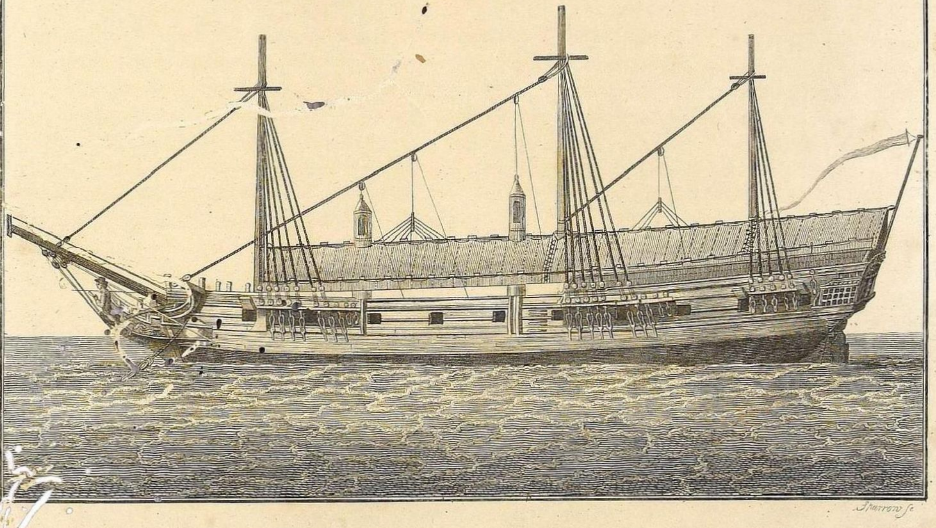
FOR THE CURTAIN.

4 number of cloths.
15 yards in length.
60 yards.

Awnings Windsails, &c.



The Awnings and Windsails of a Twenty Gun Ship, as fixed.



Sparrow sc.

Published as the Act directs, for D. Steel, Sep. 1st 1794.

QUARTER-CLOTHS.

Quarter-cloths are made of canvas No. 1 or 2. They are extended from the rough-tree-rail of the quarter-deck to the plank-ſheer. The length is taken from the aft-part of the ſtern, along the rough-tree-rail upon the quarter, to the haunch, or where the rail ends: the depths are taken from the rail to the plank-ſheer, at the fore part of the rail, at the taffarel, and at the midway between. They contain in general two whole cloths, and one gored cloth which is always placed at the lower part. The ſeams are one inch broad, and a two or three inch tabling is made all round.

RULE TO FIND THE QUANTITY OF CANVAS IN QUARTER-CLOTHS.

Multiply the number of whole cloths by the length, and add the quantity in the gored cloth.

To find the quantity in the gored cloth. Take the breadth of the gored-cloth at the ends and in the middle; add them together, and divide their ſum by three for a medium breadth. Then multiply that medium breadth by the length of the cloth.

EXAMPLE.

	20	yards; length.
	2	number of whole cloths.
	40	yards.
	$6\frac{2}{3}$	- - - in the gored-cloth.
Total	$46\frac{2}{3}$	yards in the quarter-cloth.

To find the quantity in the gored cloth.

Breadth at the fore part of the rail.		12 inches.
- - - - - - - -middle.		8
- - - - - - - -aft-part.		4
	3)	24

8 inches, or $\frac{1}{3}$ of a breadth
—— multiplied by 20 yards,
the length is 6 yards, 24 inches.

MAST-COATS.

Maſt-coats are made of canvas No. 1 or 2, to fit round the maſt and hole in the deck. When fixed, they have the ſhape of a cone. Girth the maſt about 18 inches above the deck, and girth round the deck three inches from the maſt-hole. This gives the circumference at top and bottom. The length is obtained by meaſuring ſtrait the diſtance between the places girthed. Divide the lower girths into an equal number of parts, ſuitably to the width of the canvas, allowing for the ſeams, which are one inch wide. The cloths muſt be gored upwards, to produce the circumference of the maſt at the top-girth, and, when ſewed together, cut with a ſweep to ſet neatly round the maſt. The upper part is then ſewed into a double canvas collar, ſix inches wide.

RULE TO FIND THE QUANTITY OF CANVAS IN MAST-COATS.

Multiply the number of cloths by the length, and add the quantity in the collar.

EXAMPLE.

	F.	In.	
	1	8	length.
		4	number of cloths.
	6	8	
	3		feet in the collar.
Total	9	8	or $3\frac{1}{4}$ yards.

RUDDER-COATS.

Rudder-coats are made of canvas No. 1 or 2, to fit round the rudder and the hole in the counter. Girth the circumference of the rudder-hole; then round the rudder and part of the ftern-poft about four feet below the counter. This gives the width at top and bottom. The length is obtained by meafuring the diftance between the places girthed.

Divide the upper girths into an equal number of breadths, fuitably to the canvas, allowing for the feams. The cloths are gored downwards with a fmall fweep, that the coat may bag, and not fet too tight when fixed. The feams are one inch wide, and a two or three inch tabling is made all round.

RULE TO FIND THE QUANTITY OF CANVAS IN A RUDDER-COAT.

Multiply the number of cloths by the length of the coat.

EXAMPLE.

	F.	In.	
	4	9	length of the coat.
		6	number of cloths.
Total	28	6	or $9\frac{1}{2}$ yards.

WINDSAIL, OR VENTILATOR.

The windfail or ventilator is made of canvas No. 1 or 2. It is ufed for circulating frefh air between deck; and is in the form of a cylinder. Four breadths are fewed together, and the outer felvages joined, with an inch feam, leaving one cloth four feet fhort of the top. A three inch tabling goes round the top and bottom. It is kept diftended by circular hoops, made of afh, fewed to the infide; one at top, and one at every fix feet diftance. The upper part, or top, is covered with canvas, and a fmall rope fewed round the edge; into which are fpliced, at the quarters, the ends of two pieces of rope, that are fewed up to the middle, and an eye formed by feizing the bights. The length of a windfail is taken nine feet above the deck to three or four feet below the lower hatchway.

RULE TO FIND THE QUANTITY OF CANVAS IN THE VENTILATOR.

Multiply the number of cloths by the length.

EXAMPLE.

	4	number of cloths.
	9	yards in length.
Total	36	yards.

PARLIAMENTARY REGULATIONS RELATIVE TO SAILS AND SAIL-CLOTH.

THE manufacturing of ſails and ſail-cloth has attracted the attention of the legiſlature. Regulations have been eſtabliſhed and encouragements given, from time to time, for the maker of ſail-cloth as well as for the ſail-maker.

The act of the 7 and 8 William III. c. 10. § 14. enacts, "That ſo much of Engliſh ſail-cloth as ſhall be found fit for the ſervice of his majeſty's navy, ſhall have the preference of all foreign ſail-cloth; and the commiſſioners of the navy are directed and required, from time to time, to contract and agree for ſuch Engliſh-made ſail-cloth, and to allow the makers and manufacturers thereof a recompence of two-pence per yard for the ſame above what they pay for foreign cloth of equal ſtrength and goodneſs." The acts, however, that materially affect this ſubject, are the 9 Geo. II. c. 37. and the 19 Geo. II. c. 27. both of which, though originally made to continue for ſeven years only, have been found ſo beneficial, that they have been continued, and ſtill do regulate this branch of naval manufacture. We have therefore ſubjoined correct abſtracts of both.

Abſtract of "An act for further encouraging and regulating the manufacture of Britiſh ſail-cloth, and for the more effectual ſecuring the duties now payable on foreign ſail-cloth imported into this kingdom.

" All foreign-made ſail-cloth or canvas, uſually entered as hollands, duck, or vitry canvas, fit for the making of ſails, and imported into Great Britain by way of merchandize, for which any duties are payable, ſhall be ſtamped at the time of the landing thereof, in the port where the ſame ſhall be imported or landed.

" The commiſſioners of the cuſtoms ſhall provide ſtamps for all foreign-made ſail cloth or canvas imported, with which, after the duty is paid, it ſhall be ſtamped; and for that purpoſe the commiſſioners ſhall cauſe ſtamps to be diſtributed to the proper officers of the cuſtoms, at every port where ſuch foreign-made ſail-cloth or canvas ſhall be imported; which officers are required to ſtamp every ſuch piece or parcel of foreign-made ſail-cloth or canvas: the ſtamp ſhall denote the place or country from whence the ſaid cloth or canvas ſhall be imported; and the commiſſioners in providing the ſtamps ſhall take care that they be ſo contrived that the impreſſion may be durable, and ſo as the ſame may be the leaſt liable to be counterfeited; and the ſaid ſtamps may be altered or renewed, from time to time, as his majeſty ſhall think fit; and if any perſon ſhall counterfeit or forge any ſuch ſtamp or impreſſion upon any foreign made ſail-cloth, then ſuch perſon ſo offending, and duly convicted thereof, ſhall forfeit the ſum of fifty pounds; and if any perſon ſhall ſell, or expoſe to ſale, any ſuch foreign-made ſail-cloth with a counterfeit ſtamp thereon, knowing the ſame to be counterfeit, ſuch offender ſhall forfeit the ſum of fifty pounds.

And for the better aſcertaining and diſtinguiſhing the ſail-cloth of the Britiſh manufacture from foreign ſail-cloth, every manufacturer of ſail-cloth in Great-Britain ſhall affix or impreſs, or cauſe to be affixed or impreſſed, on every piece of ſail-cloth by him manufactured, a ſtamp, containing the name and place of abode of ſuch manufacturer, in plain diſtinct letters and words at length; and if

any manufacturer of ſail-cloth, or other perſon, ſhall ſell or expoſe to ſale, or work up into ſails, any piece or bolt of Britiſh ſail-cloth without being ſtamped as aforeſaid, ſuch manufacturer or other perſon ſo offending, and being thereof lawfully convicted upon the oath of one or more credible witneſs or witneſſes before any juſtice of the peace for the place where the offence ſhall be committed, ſhall forfeit the ſum of ten pounds for every piece of ſail-cloth by him or them ſold or expoſed to ſale, or worked up into ſails, not being ſo ſtamped; and if any perſon ſhall wilfully or maliciouſly cut off, deſtroy, or obliterate, any ſtamp ſo affixed, (except in the tarring or working up the ſame,) or ſhall affix or impreſs any ſtamp, on which ſhall be ſtamped the name or place of abode of any other perſon, and not his or their real name or names and place or places of abode, ſuch perſon, being convicted of any of the ſaid offences, ſhall, for every offence, forfeit the ſum of five pounds; which laſt mentioned forfeiture ſhall be levied and recovered by diſtreſs, and ſale of the offender's goods and chattels, by warrant under the hands and ſeals of two or more juſtices of the peace for the place where the offence ſhall be committed, and ſhall be applied to the uſe of the informer or informers.

And, for encouraging the uſe and conſumption of the manufacture of Britiſh ſail-cloth, every ſhip or veſſel which ſhall be built in Great-Britain, and every ſhip or veſſel which ſhall be built in any of his majeſty's plantations in America, ſhall, upon her firſt ſetting out to ſea, have or be furniſhed with one full and compleat ſet of ſails made up of ſail-cloth manufactured in Great-Britain; and in caſe ſuch ſhip ſhall not, on her firſt ſetting out, be ſo fitted out and furniſhed, that then, and for every ſuch neglect and default, the maſter of ſuch ſhip ſhall forfeit the ſum of fifty pounds.

No ſail-maker, or other perſon, in this kingdom, ſhall make up into ſails or tarpawlins any foreign-made ſail-cloth or canvas, not ſtamped according to the directions of this act; and in caſe any perſon ſhall make or work up into ſails or tarpawlins any foreign-made ſail-cloth or canvas, other than as aforeſaid, ſuch ſails and tarpawlins ſhall be forfeited; and ſuch ſail-maker, &c. ſhall likewiſe forfeit the ſum of twenty pounds.

All ſail-cloth made in Great-Britain ſhall be manufactured in the manner and according to the directions hereinafter mentioned, viz. every piece or bolt of Britiſh ſail-cloth, that ſhall be 24 inches in breadth and thirty-eight yards in length, ſhall weigh according to the numbers and weights here mentioned; viz. No. 1, 44 pounds each bolt; No. 2, 41; No. 3, 38; No. 4, 35; No. 5, 32; No. 6, 29; No. 7, 24; No. 8, 21; No. 9, 18; and No. 10, 15; pounds each bolt.

And in caſe any piece or bolt of either of ſuch reſpective numbers or ſorts of Britiſh ſail-cloth ſhall be made of a different breadth or length than before mentioned, ſuch piece or bolt of Britiſh ſail-cloth ſhall be encreaſed or diminiſhed in weight, in proportion to the difference in ſuch length or breadth, and ſhall be marked or ſtamped with ſuch number as ſhall be agreeable to the weight; and the warp or chain of every piece or bolt of the firſt ſix numbers of ſuch Britiſh ſail-cloth ſhall be wholly wrought and made of double yarn, and ſhall contain, in every piece or bolt of 24 inches in breadth, at leaſt 560 double threads of yarn, and in every piece of ſuch ſail-cloth, that ſhall be 30 inches in breadth, at leaſt 700 double threads of yarn; and in every bolt of ſuch ſail-cloth that ſhall be of any other breadths than as aforeſaid, a certain number or quantity of double threads of yarn, in proportion to the number of double threads of yarn expreſſed to be contained in the breadth, as aforeſaid; and the warp and ſhoot yarn, which ſhall be wrought in every piece or bolt of the firſt four numbers of ſuch ſail-cloth, ſhall be made of long flax, without any mixture of ſhort or bar flax; or of long flax, or Italian hemp, or Braak hemp; and all the flax and hemp uſed in making the warp and ſhoot yarn of ſuch ſail-cloth, of the aforeſaid four firſt numbers, ſhall be of a ſtrong ſtaple, freſh, ſound, and

good in its kind, and well dreſſed; and the yarn well cleanſed, even ſpun and well twiſted; and all the ſhoot yarn of each piece of ſail-cloth of the four firſt numbers ſhall be full as ſtrong as the warp yarn, and cloſe ſtruck with four ſhoots of treble threads at the diſtance of every two feet or thereabouts; and both the warp and ſhoot yarn ſhall be as ſtrong as the warp and ſhoot yarn that are uſually wrought in the ſail-cloth of thoſe four firſt numbers that are made for and uſed in his majeſty's navy: and no flax yarn uſed in any Britiſh ſail-cloth ſhall be whitened with lime, on forfeiture of ſixpence per yard for every yard that ſhall be ſo whitened, made, ſold, or worked up into new ſails, in Great-Britain, any ways eſſentially different, lighter, or inferior in ſtrength and goodneſs to any of the aforeſaid directions or reſtrictions.

Every ſail-maker or other perſon, who ſhall make or work up ſail-cloth into ſails or tarpawlins, ſhall cauſe this act, or an abſtract thereof, to be put up or affixed, there to continue, in ſome public part of the loft, ſhop, or workhouſe, where his ſaid trade is carried on, or his workmen employed, under the penalty of forty ſhillings.

Abſtract of "An act for the more effectual ſecuring the duties now payable on foreign-made ſail-cloth imported into this kingdom; for charging all foreign-made ſails with a duty; and for explaining a doubt concerning ſhips being obliged at their firſt ſetting out to ſea to be furniſhed with one compleat ſet of ſails made of Britiſh ſail-cloth."

"Every maſter of any ſhip or veſſel belonging to any of his majeſty's ſubjects, navigated with any foreign-made ſail or ſails, or who ſhall have any foreign-made ſail or ſails on-board his ſhip or veſſel, ſhall, at the time of making his entry or report of ſuch ſhip or veſſel at the Cuſtom-Houſe, make a report upon oath of all foreign-made ſails uſed in or being on-board ſuch ſhip or veſſel; and he ſhall, before ſuch ſhip or veſſel is cleared by the officers of the cuſtoms inwards, where ſuch ſhip makes any diſcharge of her lading, pay the ſame duties as are payable for all foreign-made ſails imported by way of merchandize.

Every ſuch ſail ſhall be ſtamped at the port where ſuch ſhip makes her entry in manner herein-after mentioned; and in caſe the maſter of ſuch ſhip ſhall not make the ſaid entry, and pay ſuch duty before the ſhip ſhall be cleared by the officers of the cuſtoms, ſuch ſails ſhall be forfeited, and the maſter ſhall for every offence forfeit the ſum of fifty pounds, one moiety thereof to the uſe of his majeſty, and the other moiety to the perſon who ſhall ſue for the ſame.

Provided always, if the maſter of ſuch ſhip ſhall, after his report made, and before the ſhip is cleared by the officers of the cuſtoms, declare his intention of not paying the ſaid duty, and ſhall deliver to the officer of the cuſtoms of the port, where he makes ſuch report, the ſails for which he has declared his intention of not paying the ſaid duty; in ſuch caſe the ſails are hereby declared to be forfeited to his majeſty; and ſuch maſter ſhall not be ſubject or liable to pay the ſaid duty or penalty of fifty pounds.

Provided always, that nothing herein contained ſhall be deemed, conſtrued, adjudged, or taken, to charge or make liable any captain or maſter of any ſhip coming from the Eaſt-Indies, with any of the duties or forfeitures aforeſaid, for or upon account of ſuch ſhip being navigated with, or having on-board, any foreign-made ſail or ſails, which ſhall be by ſuch captain or maſter brought from the Eaſt-Indies.

All foreign-made ſail-cloth or canvas, uſually entered as hollands, duck, or vitry canvas, fit to be made uſe of for the making of ſails, which ſhall be imported into Great-Britain, by way of merchandize, and upon the importation whereof any duties are made payable, ſhall be ſtamped at the time

of the landing thereof, at or in the port or place where the ſame ſhall be imported, as hereafter mentioned.

And whereas the ſtamps uſed in purſuance of the former act are of too ſmall dimenſions, and make a very obſcure mark and impreſſion, liable to be ſoon defaced and become undiſtinguiſhable, it is enacted, that the commiſſioners of the cuſtoms ſhall provide ſtamps of 8 inches diameter each, for the ſtamping of all foreign-made ſails and foreign-made ſail-cloth, and ſhall cauſe the ſaid ſtamps to be diſtributed amongſt proper officers of the cuſtoms, of every port in Great-Britain; and the officers of every port are hereby required to ſtamp all foreign-made ſails, and foreign-made ſail-cloth, which ſhall be imported into the ſeveral ports where they reſide; and which ſtamps ſhall, in order to make the impreſſion durable, be dipped in a liquor made of red-lead, mixed with linſeed oil well boiled; and the ſtamp or impreſſion therewith made ſhall expreſs and denote the place and port in which ſuch ſails and foreign-made ſail-cloth are entered; and the commiſſioners, in providing the ſtamps, ſhall take care that they be ſo contrived, that the impreſſion may be plain and durable, and ſo as the ſame may be the leaſt liable to be counterfeited: and if any perſon ſhall counterfeit or forge any ſtamp provided in purſuance of this act, upon any foreign-made ſail-cloth, or foreign-made ſails, or ſhall ſell ſuch ſail-cloth with counterfeited or forged ſtamps, knowing the ſame to be forged, then ſuch perſon ſo offending ſhall forfeit the ſum of fifty pounds.

No ſail-maker or other perſon, within Great-Britain or in his majeſty's plantations in America, ſhall make up into ſails or tarpawlins any foreign-made ſail-cloth not ſtamped according to this act; and in caſe any perſon ſhall make up into ſails or tarpawlins, any foreign ſail-cloth other than as aforeſaid, ſuch ſails and tarpawlins ſhall be forfeited; and every perſon ſo offending, and being thereof lawfully convicted, upon the oath of one or more credible witneſſes, before one or more juſtices of the peace, for the place where the offence ſhall be committed, ſhall forfeit the ſum of fifty pounds, for every ſuch ſail or tarpawlin; which penalty of fifty pounds ſhall be levied and recovered by diſtreſs and ſale of the offender's goods and chattels, by warrant under the hands and ſeals of two or more juſtices of the peace for the place where the offence ſhall be committed, and ſhall go and be applied to the uſe of the informers; and for want of ſuch diſtreſs, ſuch juſtices may commit ſuch perſon to gaol for the ſpace of ſix months, or until he pays the penalty of fifty pounds.

Every perſon who ſhall make up into ſails any foreign-made ſail-cloth, ſhall place the ſtamps affixed or impreſſed on ſuch foreign ſail-cloth in the moſt conſpicuous part of ſuch ſails, (that is to ſay,) on the after-ſide of ſuch ſails, and in ſuch manner, that the number of ſtamps in every ſail may appear proportionably to the number of bolts or pieces contained in the ſaid ſail; and in caſe any perſon ſhall make up any foreign-made ſail-cloth or canvas, into ſails, in any other manner than as aforeſaid, ſuch ſails ſhall be forfeited, and ſuch perſon ſhall for every offence forfeit the ſum of ten pounds.

No perſon whatſoever ſhall alter, repair, or mend, any ſails, made of foreign-made ſail-cloth, not ſtamped according to this act; and in caſe any perſon ſhall alter, repair, or mend any ſails not ſtamped as aforeſaid, ſuch perſon ſhall, for every ſail ſo mended, forfeit the ſum of twenty pounds.

Every ſail-maker in Great-Britain, and in his majeſty's plantations in America, ſhall affix or impreſs, or cauſe to be affixed or impreſſed, on every new ſail by him ſo made, a ſtamp, 8 inches in diameter, containing the name and place of abode of ſuch ſail-maker in plain diſtinct letters and words at length; and which ſaid ſtamp, in order to make the impreſſion durable, ſhall be dipped in a liquid made with lamp-black, mixed with linſeed-oil well boiled; and in caſe any perſon ſhall make any new ſail, and ſhall deliver the ſame to any captain or maſter of any ſhip or veſſel, not being ſtampt

with his na[illegible] , and every perſon ſhall, for every ſail by him ſo delivered, not ſtamped, forfeit the ſum of ten pounds.

And whereas doubts have ariſen about the meaning of a clauſe in the preceding act, of the ninth year of his preſent majeſty's reign, by which ſhips are obliged at their firſt ſetting out, or being firſt navigated at ſea, to be furniſhed with one full and compleat ſet of ſails made of ſail-cloth manufactured in Great-Britain: to obviate ſuch doubts for the future, it is enacted, that every ſhip or veſſel built in Great-Britain, or in his majeſty's plantations in America, ſhall upon her firſt ſetting out, or being firſt navigated, be furniſhed with one compleat ſet of new ſails, (*bona fide* belonging to ſuch ſhip or veſſel) made of ſail-cloth manufactured in Great-Britain; and in caſe ſuch ſhip or veſſel ſhall not, on her firſt ſetting out, be furniſhed with a new ſet of ſails made of ſail-cloth of the manufacture of Great-Britain as aforeſaid, that, for every ſuch default, the maſter of ſuch ſhip or veſſel ſhall forfeit the ſum of fifty pounds.

It has been ſubſequently enacted by the 33 Geo. III. c. 49. that no part of the penalties, contained in the 9 Geo. II. c. 37. which do not attach to double ſail cloth, ſhall extend to Britiſh canvas made with ſingle thread warps, corded or not corded, and fit for or made into ſails. And that ſuch ſingle canvas ſhall be deemed Britiſh ſail cloth, and be equally entitled, with double canvas, to the bounties. Provided that the ſaid ſingle thread ſail cloth be made of equally good materials, and be conformable, in weight and all other things, to the reſtrictions on double thread ſail cloth.

DUTIES PAYABLE UPON THE IMPORTATION OF SAIL CLOTH.

	£.	s.	d.
Sail cloth or duck, Dutch or French, not exceeding 36 inches in breadth for 120 ells,	2	3	1
Sail cloth or duck, Dutch or French, exceeding 36 inches for 120 ells,	3	16	1
Sail cloth of Ruſſia, in Britiſh ſhips, not exceeding 36 inches for 120 ells,	2	1	9
Sail cloth of Ruſſia, in foreign ſhips, not exceeding 36 inches for 120 ells,	2	3	1
Sail cloth of Ruſſia, in Britiſh ſhips, exceeding 36 inches for 120 ells,	3	14	9
Sail cloth of Ruſſia, in foreign ſhips, exceeding 36 inches for 120 ells,	3	16	1
Sail cloth of Ruſſia, not exceeding 36 inches, and not otherwiſe enumerated, for 120 ells,	2	1	
Sail cloth of Ruſſia, exceeding 36 inches, and not otherwiſe enumerated, for 120 ells,	3	14	9
Sail cloth or canvas, of Ireland, on which the bounty of 4d. per yard has been there granted, and of the value of 1s. 2d. per yard, or upwards, the yard,	0	0	4
Sail cloth or canvas, of Ireland, on which the bounty of 2d. per yard has been there granted, of the value of 10d. and under 1s. 2d. the yard, per yard,	0	0	2
Sails ready made, for every 100 pounds value thereof,	45	0	0

It is the practice of Government to mark each bolt or piece of canvas, before it is made up into ſails, with a blue ſtreak down the middle; made with a compoſition of linſeed oil, white lead, and ground indigo, well boiled together.

By the 9 and 10 Wm. III. c. 41. Any perſon in whoſe poſſeſſion any canvas with the blue ſtreak up the middle, being the king's mark, is found, without a certificate of its having been purchaſed of the commiſſioners of the navy, forfeits the property, and is liable to the penalty of £200 with coſts of ſuit. By the 9 Geo. I. c. 8. The judge, before whom ſuch offender is convicted, is empowered to mitigate the penalty, commit until the ſame be paid, or order corporal puniſhment, by being publickly whipped; or kept to hard labour for a time, not exceeding ſix months.

The commiſſioners of his majeſty's navy by the 1ſt. of Geo. I. c. 15. are empowered, for embezzlement of the king's ſtores under the value of 20s. to fine the offender, not exceeding double the value taken; or to impriſon, not exceeding three months.

TABLE I.

Shewing the Length of any Gore by its Depth, from 1 Inch to 6 Feet in Depth, on the Selvage of Canvass 24 Inches wide.

EXAMPLE.

In the Column of Depth, find the Depth required, and the opposite Column will shew the proper Length. Suppose the Depth be 3 Feet 5 Inches, opposite to it will be found 4 Feet, which is the Length required.

Depth down the Selvage.	Length of the Gore	Depth down the Selvage.	Length of the Gore.	Depth down the Selvage.	Length of the Gore.	Depth down the Selvage.	Length of the Core.	Depth down the Selvage.	Length of the Gore.	Depth down the Selvage.	Length of the Gore.
Feet. Inc.	Feet. Inc.	Feet. Inc.	Feet. Inc.	Feet. Inc.	Feet. Inc.	Feet. Inc.	Feet. Inc.	Feet. Inc.	Feet. Inc.	Feet. Inc.	Feet. Inc.
0 1	2 0	1 1	2 $3\frac{1}{4}$	2 1	2 $10\frac{3}{4}$	3 1	3 $8\frac{1}{2}$	4 1	4 7	5 1	5 $5\frac{1}{2}$
0 2	2 0	1 2	2 $3\frac{3}{4}$	2 2	2 $11\frac{1}{2}$	3 2	3 $9\frac{3}{8}$	4 2	4 $7\frac{7}{8}$	5 2	5 $6\frac{3}{8}$
0 3	2 $0\frac{1}{8}$	1 3	2 $4\frac{1}{4}$	2 3	3 $0\frac{1}{4}$	3 3	3 $10\frac{1}{4}$	4 3	4 $8\frac{3}{4}$	5 3	5 $7\frac{1}{4}$
0 4	2 $0\frac{1}{4}$	1 4	2 $4\frac{3}{4}$	2 4	3 1	3 4	3 $11\frac{1}{8}$	4 4	4 $9\frac{5}{8}$	5 4	5 $8\frac{1}{8}$
0 5	2 $0\frac{3}{8}$	1 5	2 $5\frac{1}{4}$	2 5	3 $1\frac{3}{4}$	3 5	4 0	4 5	4 $10\frac{1}{2}$	5 5	5 9
0 6	2 $0\frac{1}{2}$	1 6	2 $5\frac{3}{4}$	2 6	3 $2\frac{1}{2}$	3 6	4 $0\frac{7}{8}$	4 6	4 $11\frac{3}{8}$	5 6	5 10
0 7	2 $0\frac{3}{4}$	1 7	2 $6\frac{1}{4}$	2 7	3 $3\frac{1}{4}$	3 7	4 $1\frac{3}{4}$	4 7	5 $0\frac{1}{4}$	5 7	5 11
0 8	2 $1\frac{1}{8}$	1 8	2 7	2 8	3 $4\frac{1}{8}$	3 8	4 $2\frac{5}{8}$	4 8	5 $1\frac{1}{8}$	5 8	6 0
0 9	2 $1\frac{1}{2}$	1 9	2 $7\frac{3}{4}$	2 9	3 5	3 9	4 $3\frac{1}{2}$	4 9	5 2	5 9	6 1
0 10	2 $1\frac{7}{8}$	1 10	2 $8\frac{1}{2}$	2 10	3 $5\frac{7}{8}$	3 10	4 $4\frac{3}{8}$	4 10	5 $2\frac{7}{8}$	5 10	6 2
0 11	2 $2\frac{1}{4}$	1 11	2 $9\frac{1}{4}$	2 11	3 $6\frac{3}{4}$	3 11	4 $5\frac{1}{4}$	4 11	5 $3\frac{3}{4}$	5 11	6 3
1 0	2 $2\frac{3}{4}$	2 0	2 10	3 0	3 $7\frac{5}{8}$	4 0	4 $6\frac{1}{8}$	5 0	5 $4\frac{5}{8}$	6 0	6 4

TABLE II.

The Number of Reefs, Points, Ropebands, and Gaskets, in fitting each of the undermentioned Sails.

Number of Guns.	Spritsail Course.				Fore Course.				Main Course.				Total of the Courses				Fore Topsail.				Main Topsail.				Mizen Topsail.				Total of the Topsails.			
	Reefs.	Points	Rope-Bands	Gaskets.	Reefs.	Points.	Rope-Bands	Gaskets.	Reefs.	Points.	Rope-Bands	Gaskets.	Reefs.	Points.	Rope-Bands	Gaskets.	Reefs.	Points.	Rope-Bands	Gaskets.	Reefs.	Points.	Rope-Bands	Gaskets.	Reefs.	Points.	Rope-Bands	Gaskets.	Reefs.	Points.	Rope-Bands	Gaskets.
100	2	64	64	6	1	90	90	8	1	102	102	8	4	256	256	22	3	180	52	6	3	210	61	6	2	92	42	4	8	482	155	16
90	2	60	60	6	1	86	86	8	1	98	98	8	4	244	244	22	3	171	50	6	3	198	58	6	2	88	40	4	8	457	148	16
80	2	58	58	6	1	82	82	8	1	94	94	8	4	234	234	22	3	165	48	6	3	192	56	6	2	86	40	4	8	443	144	16
74	2	62	62	6	1	86	86	8	1	98	98	8	4	246	246	22	3	177	52	6	3	204	60	6	2	90	41	4	8	471	153	16
70	2	58	58	6	1	82	82	8	1	92	92	8	4	232	232	22	3	165	49	6	3	189	56	6	2	85	39	4	8	439	144	16
64	2	58	58	6	1	80	80	8	1	92	92	8	4	230	230	22	3	165	49	6	3	189	56	[illegible]	2	85	39	4	8	439	144	16
60	2	54	54	6	1	78	78	8	1	88	88	8	4	220	220	22	3	156	45	6	3	180	52	[illegible]	2	80	30	4	8	416	133	16
50	2	52	52	4	1	72	72	6	1	82	82	6	4	206	206	16	3	147	43	4	3	168	49	4	2	72	33	4	8	387	125	12
44	2	46	46	4	1	66	66	6	1	74	74	6	4	186	186	16	3	135	39	4	3	150	44	4	2	[illegible]	30	2	8	351	113	10
38 & 36	2	50	50	4	2	132	66	6	2	152	76	6	6	334	192	16	3	138	41	4	3	153	46	4	2	70	33	2	8	361	120	10
32	2	50	50	4	2	128	64	6	2	148	74	6	6	326	188	16	3	135	40	4	3	150	44	4	2	68	32	2	8	353	116	[illegible]
28	2	50	50	4	2	128	64	6	2	148	74	6	6	326	188	16	3	135	41	4	3	150	44	4	2	69	30	2	8	354	114	10
24	2	40	40	2	2	112	56	4	2	128	64	4	6	280	160	10	3	117	34	4	3	132	38	4	2	62	27	2	8	[illegible]	99	10
20	2	36	36	2	2	104	52	4	2	116	58	4	6	256	146	10	3	112	32	4	3	132	38	4	2	58	26	2	8	302	96	10
Sloops	2	32	32	2	2	92	46	4	2	108	54	4	6	232	132	10	3	99	30	4	3	111	32	4	2	48	22	2	8	258	84	10

☞ If more Points, Ropebands, or Gaskets, are used than in the Table, they are made on-board.

TABLE III.

A Table of the Sizes of all Bolt-Ropes.

GUNS.	110 & 100		90,84 & 74		80		70 & 64		60		50		44,38,36, 32 & 28		24 & 20		Sloops.		Brigs.		Cutters.		1200 T.		700 Tons.		500 Tons.		400 Tons.	
	Ropes.		Rope		Rope		Rope		Rope		Rope		Rope		Rope		Rope		Rope		Ropes.		Rope		Rope		Rope		Rope	
NAMES OF THE SAILS.	Bolt.	Head.	Bolt.	Head.	Bolt.	Head.	Bolt.	Head.	Bolt.	Head.	Bolt.	Head.	Bolt.	Head.	Bolt.	Head.	Bolt.	Head.	Bolt.	Head.	Bolt.	Head.	Bolt.	Head.	Bolt.	Head.	Bolt.	Head.	Bolt.	Head.
	Inc.	Inc.	In	In	In	In	In	In	In	In	In	In	In	In	In	In	In	In	In	In	Inches.	Inches.								
Main Courſes — Head / Leech	6	2½	5¾	2½	5½	2¼	5½	2¼	5	2	4¾	1¾	4½	1¾	4	1½	3½	1½	3½	1½	3	1½ / 1¾	5½	2¼	4½	1¾	4	1½	3½	1½
Fore Courſes — — —	5½	2¼	5¼	2¼	5	2	5	2	4½	1¾	4¼	1¾	4	1¾	3½	1½	3	1½	3	1½	Try S. or Storm		5	2	4	1¾	3½	1½	3	1½
Mizen Courſes — Head / Leech	4½	1¾	4¼	1¾	4	1¾	3½	1¾	3¼	1½	3	1½	2¾	1½	2½	1½	2¼	1½			Main-Sail		3½	1¾	2¾	1½	2½	1½	2¼	1½
Leech — — —	3½		3¼		3		3		2¾		2½		2¼		2		1¾				3	1½ / 1¾	3		2¼		2		1¾	
Main Topſails — —	5¾	2½	5½	2¼	5¼	2	5	2	4¾	1¾	4½	1¾	4¼	1¾	3¾	1½	3	1½	3	1¼	2¼	1½	5	2	4¼	1¾	3¾	1½	3¼	1½
Leeches — — —	5		4¾		4½		4¼		4		3¾		3½		3		2½		2½		2¼		4¼		3½		3		2½	
Fore Topſails — —	5¼	2	5	2	4¾	1¾	4½	1¾	4¼	1¾	4	1½	3¾	1½	3¼	1½	2¾	1¼	2¾	1¼	Save all TopSail		4½	1¾	3¾	1½	3¼	1½	2¾	1¾
Leeches — — — —	4½		4¼		4		3¾		3½		3¼		3		2¾		2¼		2¼		1½	1	3¾		3		2¾		2½	
Mizen Topſails — —	3½	1½	3½	1½	3¼	1½	3¼	1½	3	1½	3	1½	3	1½	2¾	1¼	2¼	1¼			Main T. Gal. Sa.		3¼	1½	3	1½	2¾	1¼	2¼	1¼
Leeches — — —	2¾		2¾		2½		2½		2½		2½		2½		2¼		1¾				1¾	1	2½		2½		2¼		1¾	
Sprit Courſe — — —	3¼	1¾	3¼	1¾	3	1½	3	1½	2¾	1½	2½	1½	2¼	1½	2	1½	1¾	1¼			Square Sail		3	1½	2¼	1½	2	1½	1¾	1¼
*Sprit T. S. Main & F. TopG. S.	2¾	1½	2¾	1½	2½	1½	2½	1½	2¼	1¼	2¼	1¼	2	1¼	1¾	1¼	1½	1	1½	1	2¼	1½	2½	1½	2	1¼	1¾	1¼	1½	1
Main & Fore Stayſails — —	3¼		3¼		3		3		2¾		2¼		2½		2¼		2		2		Gaff Top Sail		3		2½		2¼		2	
Fore Top StaySail — Head / Aft. Leech	2¾		2¾		2½		2½		2½		2¼		2¼		2		2		1¾		2¼	1 / 1¾	2½		2¼		2		2	
Main Top Stay Sail — —	2	3½	2	3½	2	3¼	1¾	3	1¾	2¾	1¾	2¾	1½	2½	1½	2¼	1¼	2	1¼	2	Fore Sail		1¾	3	1½	2½	1½	2¼	1¼	2
Middle Stay Sail — —	1¾	3¼	1¾	3	1¾	2¾	1¾	2¾	1½	2½	1½	2½	1½	2¼	1¼	2	1¼	1¾	1¼	1¾	2	3	1¾	2¾	1½	2¼	1½	2	1¼	1¾
Mizen Stay Sails — —	3¼	3¼	3¼		3		3		3		2¾		2½		2¼		2				Storm Fore Sail		3		2½		2¼		2	
Main Top Gall. & Mizen Top Stay Sails — Leech / Foot	1¾	2¾	1¾	2¾	1½	2½	1½	2½	1½	2¼	1½	2¼	1¼	2	1¼	1¾	1¼	1¾			1¾ / 2¾	3½	1½	2½	1¼	2	1¼	1¾	1¼	1¾
Main, Fore, & Top, Stud. Sa.	2¼	1¼	2¼	1¼	2	1¼	2	1¼	2	1¼	2	1¼	1¾	1¼	1¼	1¼	1½	1	1½	1	Ring Tail 1½	½	2	1¼	1¾	1¼	1¾	1¼	1½	1
TopGal. Stud. Miz. TopGal. Sail & Main & Fore Royals	2	1¼	2	1¼	1¾	1¼	1¾	1¼	1½	1	1½	1	1½	1	1¼	1	1¼	1	1¼	1	Water Sail 2¼	1¾	1¾	1¼	1½	1	1¼	1	1¼	1
Mizen Royal — Leech / Foot	1¾	1	1¾	1	1½	1	1½	1	1½	1	1¼	1	1¼	1	1	¾	1	¾			First Jib 1½ / 4	6	1½	1	1¼	1	1	¾	1	¾
Flying Jibs — — Leech / Foot	1¾	3½	1¾	3¼	1½	3	1½	3	1½	2¾	1½	2¾	1½	2¾	1¼	2½	1¼	2¼	1¼	2¼	Second Jib 1½ / 4	6	1½	3	1½	2¾	1¼	2½	1¼	2¼
Driver Sails — — Leech / Foot	3	1¾	2¾	1¾	2¾	1¾	2½	1½	2½	1½	2½	1½	2½	1½	2¼	1¼	2	1¼			Third Jib 1½ / 4	6	2½	1½	2¼	1¼	2¼	1¼	2	1¼
Boats Sails — — Leech / Foot	Latteen S.		1½	1	Settee Sail		1½	1	Lug Sail		1½	1	Sprit Sail		1¼	1¼	Jib		1½	1	Storm Jib 1½ / 3½	5								

Clue-Ropes for the Main and Fore Courſes to be 2 Inches bigger from 50 upwards, and 1½ bigger downwards.

Clue-Ropes for the Mizen Courſes ½ an Inch bigger and 3 Fathoms long. Cringles ½ an Inch leſs than the Rope.

Clue-Ropes to Flying-Jibs and Drivers to be ½ an Inch bigger and 2 Fathoms long.

* All Stay-Sails have Clue-Ropes ½ an Inch bigger and 2 Fathoms long.

TABLE IV.

Dimensions of the different Sails belonging to a Ship of each Class in the Royal Navy and Merchant-Service.

NAMES OF THE SAILS.	100 GUNS.			90 GUNS.			80 GUNS.			74 GUNS.			64 GUNS.			50 GUNS.			44 GUNS.			38 GUNS.			36 GUNS.			32 GUNS.		
	No. of Cloths. Head.	No. of Cloths. Foot.	Depth in Yards	No. of Cloths. Head.	No. of Cloths. Foot.	Depth in Yards	No. of Cloths. Head.	No. of Cloths. Foot.	Depth in Yards	No. of Cloths. Head.	No. of Cloths. Foot.	Depth in Yards	No. of Cloths. Head.	No. of Cloths. Foot.	Depth in Yards	No. of Cloths. Head.	No. of Cloths. Foot.	Depth in Yards	No. of Cloths. Head.	No. of Cloths. Foot.	Depth in Yards	No. of Cloths. Head.	No. of Cloths. Foot.	Depth in Yards	No. of Cloths. Head.	No. of Cloths. Foot.	Depth in Yards	No. of Cloths. Head.	No. of Cloths. Foot.	Depth in Yards
Main Course —	47½	50	14½	46	48	14	44	46	14	46	48	15¾	41½	44	14	39	41	13	37½	40	12	38½	40½	13¾	37	39	13¼	35	37	13
Fore Course — —	42	40	12¼	40	38	11½	39	37	12	40	38	13	36	34	12	34½	33½	11½	33	32	10	33½	32½	11	32½	31½	11¾	30½	29½	11
Miz. Co Fo. Leech After D°	17	18	10½ 20½	16	17	9½ 19½	16	17	9 19	16	17	11 21	14½	15½	9¼ 17¼	13	14	8½ 16¼	12	13	9½ 17	13	14	11¼ 18¼	13	14	10¼ 18¾	11	11	10 18
Main Top — —	30½	48½	21	29½	47	20	28	45	19½	30	47	19¾	27	43	17½	26	40	16¼	24	38½	16½	24½	39½	16	24	38	16¼	23½	35½	15½
Fore Top — —	26½	43	19	25½	41	18	24½	39½	18	26	41	17½	23	37	15¾	22	35	14¾	21½	33½	14¼	22	34	14½	21½	33	14¼	19½	31	13¾
Miz. Top Middle Clue —	20½	31	14¼ 15	20½	29	13¾ 14½	19	28	13¼ 14	20½	30	13¾ 14	18½	27	12 12¾	17	25½	11¼ 12	17	25	11½ 12¼	17½	25½	11¾ 12½	17	25	11¼ 12	16	23	11 11¾
Main Top Gallant —	22½	30½	10½	21	30	10	21½	29	9½	21½	30½	10	19½	27½	9	17½	26½	8	17	25	8	17½	25½	8¼	16	25	7¾	15½	23½	7¾
Fore Top Gallant —	19½	27	9½	18½	26	8¾	18½	25	8½	18½	26½	8¾	17	24	8¼	14½	23	7¼	15	22	7	15	23	7¾	14½	22½	6¾	13½	21	6¾
Mizen Top Gallant	15	21	7	15	22	7	13½	20½	6¾	15	21	7¼	13½	19½	6¾	12½	17½	6¼	12½	18	6	13	18	6¾	12½	18	6¼	11½	17	6
Main Royal — —	18	23	8½	17	22	7½	16	21	7	17	22	7½	15	20	7	13	18	6	12	17	6	13	18	6¼	11	16	6¼	11	16	5¾
Fore Royal — —	16	20	7½	15	19	6¾	14	18	6¼	15	19	6¾	13	17½	6¼	11	15	5¼	11	15	5	11	15	5¾	11	15	5½	10	14	5
Mizen Royal —	11	15	5½	11	15	5½	10	14	5¼	11	15	5½	10	14	5	9	13	4¾	9	13	4½	9	13	4¾	9	13	4¾	8	12	4½
Main Stay — —	0	32	15	0	31	14	0	30	14	0	31	15¾	0	28	14	0	26	13	0	24	12	0	24	13¾	0	24	14	0	23	13
Fore Stay — —	0	23	13	0	22	12	0	21	12	0	22	13	0	19	11½	0	18	11	0	17	10	0	17	11	0	17	12	0	16	11
Miz D° Bunt — Aft Leech	23	25	8½ 14	21	23	8 13	21	23	8 13	20½	22½	9 13½	19½	21	7½ 11½	18	20	7 11	16	18	6½ 10½	16	18	7 12	16	18	7 12	16	18	6½ 11½
MaTop Bunt — MastD° Aft Leech	26	28	10 26	25	27	9 24	24	26	9 24	25	27	9½ 24	22	24	9 22¼	21	23	8¾ 21¾	19½	21½	8 20½	19½	21½	8 20½	19½	21½	8 20½	19	21	8 20½
Fore Top Mast Stay	0	22	19	0	21	18	0	20	17½	0	21	17½	0	18	16	0	17	15	0	16	14	0	16	14½	0	16	14	0	15	13¾
Miz To Bunt — MastD° Aft. Leech	20	21	7 16	19	20	6½ 14½	18	19	6 15	19	20	6½ 14½	16	17	5 13	15	16	4½ 13	13	14	4 12	13	14	4 12	13	14	4 12	13	14	4 12
Middle Bunt — Stay Aft. Leech	25	25	8 17	24	24	7½ 16½	23	23	7 15½	24	24	7½ 16½	21	21	6 13½	20	20	5½ 13	18	18	5 12	18	18	5 12	18	18	5 12	18	18	5 12
MaTop Bunt — Gall D° Aft. Leech	22	22	7 16½	21	21	6 15½	20	20	6 15½	21	21	6 15½	18	18	5 14	17	17	4½ 13½	15	15	4½ 12	15	15	4 12	15	15	4 12	15	15	4 12
Main Studding —	20	20	17½	19	19	17	18	18	17	19	19	18½	16	16	16½	16	16	15½	15	15	14½	15	15	15¼	15	15	15¼	14	14	15
Fore Studding —	19	19	14½	18	18	14	17	17	14½	18	18	15	15	15	13	15	15	13	14	14	12	14	14	13	14	14	13¾	13	13	13
MainTopMast Ditto	16	20	22	15	19	21	14	18	20½	15	19	23¾	12	16	18½	11	16	17¼	11	15	17½	11	15	17¼	11	15	17¼	10	14	16½
Fore Top Mast Ditto	15	19	20	14	18	19	13	17	18½	14	18	18½	11	15	17	10	15	15¾	10	14	15¼	10	14	15½	10	14	15¼	9	13	14¼
MainTopGall. Stud.	12	16	11	11	15	10½	10	14	10	11	15	10¼	9	12	9½	8	11	8½	8	11	8½	8	11	8¾	8	11	8¼	7	10	8¼
ForeTopGall. Stud.	11	15	10	10	14	9	9	13	9	10	14	9¼	8	11	8½	7	10	7¾	7	10	7½	7	10	7¾	7	10	7¼	6	9	7¼
Jib Flying — —	0	27	26	0	26	25	0	25	24	0	26	25	0	24	23	0	23	22	0	22	21	0	22	21	0	21	20	0	20	19
Sprit Course — —	30	30	9	28	28	9	27	27	8½	29	29	8	26	26	7½	25	25	7	24	24	6	[illegible]	25	6	24	24	6	23	23	6
Sprit Top — —	20	30½	9½	18½	28½	10	18	27½	9½	18½	29½	10	17	27	9	14½	25	8	14	24½	8	[illegible]	25	8¼	14½	24½	7¾	13½	23	7¾
Driver For Leech Aft. Leech	23	29	10 22½	22	28	10 22½	22½	28½	11 23½	25½	32½	11 24	22½	29	9½ 20	19	24	8½ 19	18	24	8 19	19	25	11 22½	19	25	11 22	18	24	10 21

NAMES OF THE SAILS.	28 Guns. No. of Cloths. Head.	Foot.	Depth in Yards	24 Guns. No. of Cloths. Head.	Foot.	Depth in Yards	20 Guns. No. of Cloths. Head.	Foot.	Depth in Yards	Sloops. No. of Cloths. Head.	Foot.	Depth in Yards	Brigs. No. of Cloths. Head.	Foot.	Depth in Yards
Main Courfe { Fo. Leech / Aft. Leech	33	35	12	30½	32½	11	29	31	10	25½	28½	9½	13½	19	9 13½
Fore Courfe	29½	28½	10¼	27	26	9	26	25	9	22½	21½	7¾	18	18	6½
Mizen Courfe { Fo. Leech / Aft. Leech	9½	10½	9½ 17	10	10	9 15½	10	10	8 13½	7	8	7 13	0	0	0
Main Top { Middle / Clue	22	34	14¾	20	31½	13¾	19½	30	13¼	16	26½	11½	12½	19	9¾ 10¼
Fore Top { Middle / Clue	19	30	13	17	27½	12¼	16½	26½	11¾	14	23	10¼	12½	19	9½ 10
Mizen Top { Middle / Clue	15	22	10½ 11¼	13½	20	9¼ 10	13½	19½	9¼ 10	11½	17	7¼ 8	0	0	0
Main Top Gallant	15	23	7½	14	20½	6¾	13½	20	6½	11½	17	5¾	10	14	5
Fore Top Gallant	13	20	6½	12	18	6	11½	17½	5¾	10	15	5¼	9	13	4½
Mizen Top Gallant	11	16	5⅔	10½	14½	5	9½	14	5	8	12	4¾	0	0	0
Main Royal	10	15	5½	9	14	4¾	8	13	4½	7½	11½	3½	6	10	3½
Fore Royal	9½	13½	4½	8½	12½	4	7	11	3¾	7	10½	3	5	9	3
Mizen Royal	7	11	4	7	11	3¼	6	10	3	4	8	3¼	0	0	0
Main Stay { Bunt / Aft. Leech	0	23	12	0	22	11½	0	22	10	0	17	9½	0	15	1 8½
Fore Stay	0	16	10¼	0	15	9½	0	15	9	0	12	8	0	11	7
Mizen Stay { Bunt / Aft Leach	15	17	5½ 10½	14	16	5½ 9½	13	15	5 9	12	13	5 9	0	0	0
MaTop MaftD° { Bunt / Aft Leach	19	21	8 20½	17	19	7 18	17	19	7 18	14	16	5½ 15½	12	14	4 12
Fore Top Maft Stay	0	15	13	0	14	12½	0	14	12	0	12	10¼	0	11	9½
Miz. T. Stay { Bunt / Aft. Leach	13	14	4 12	11	12	3 10½	11	12	3 10½	9	10	3 9½	0	0	0
Middle Stay { Bunt / Aft. Leach	18	18	5 12	16	16	4¾ 10¼	16	16	4¼ 10¼	13	13	4 10	10	10	3 9
MaTop Gal. D° { Bunt / Aft Leach	15	15	4 12	13	13	2¾ 10¾	13	13	2¼ 10¾	12	12	2½ 9½	9	9	2 9
Main Studding	13	13	14	12	12	13	12	12	13	11	11	11	8	8	9
Fore Studding	12	12	12	11	11	11	11	11	11	10	10	9	7	7	7
MainTopMaft Stud.	9	13	15¾	8	12	14½	8	12	14	8	11	12	4	8	10½
Fore Top Maft Stud.	8	12	14	7	11	13	7	11	12½	7	10	11	3	7	10
MainTopGall. Stud.	6	9	8	6	8	7¼	6	8	7	5	8	6¼	0	0	0
ForeTop Gall. Stud.	5	8	7	5	7	6½	5	7	6¼	4	7	5¾	0	0	0
Flying Jib	0	20	19	0	19	18	0	19	18	0	16	15	0	13	12
Sprit Courfe	21	21	6	19	19	5½	19	19	5½	16	16	5	0	0	0
Sprit Top	13	21	7½	12	20	6¾	11½	19½	6	10	17	5¾	0	0	0
Driver { Fo. Leech / Aft. Leech	16	21	9 19	15	19	8 17	14	18	8 16	12	16	7 15	0	0	0
BoatSa. { Fo. Leech / Aft. Leech				Latteen Sail	7	6½			Settee Sail	10	11	1 7	0	Lug-Sail	

NAMES OF THE SAILS.	Cut. 200 T. No. of Cloths. Head.	Foot.	Depth in Yards	1200 Tons. No. of Cloths. Head.	Foot.	Depth in Yards	700 Tons. No. of Cloths. Head.	Foot.	Depth in Yards	500 Tons. No. of Cloths. Head.	Foot.	Depth in Yards	350 to 360 T. No. of Cloths. Head.	Foot.	Depth in Yards
Main Courfe { Fo. Leech / Aft. Leech	22	30	18 24	40	42	13	36	38	11½	24	24	10	18	20	9½
Fore Courfe	Tryf. or ftor. Main-Sail.			37	37	11½	34	34	10	22	22	9	16	16	8½
Mizen Courfe { Fo. Leech / Aft. Leech	9	19	14 17	16	17	9 17½	15	17	7½ 16½	9½	11	7 14	8	9	6½ 12½
Main Top { Middle / Clue	23	27	13¾ 15¼	25	39	16½	22	36	15½	16	22	12	15	22	11½
Fore Top { Middle / Clue	Save all Top Sail.			24	38	16	20	34	14	14½	21½	12	14	20	10
Mizen Top { Middle / Clue	8	24	5	18	28	11½ 12½	16	23	11 12	13	18½	8¼	12	17	9 9½
Main Top Gallant	7½	16½	6½	18	28	9¾	15	23	7½	14	18	8½	13	17	7
Fore Top Gallant				17	27	9¼	14	21	6½	12	16	7½	12	16	6½
Mizen Top Gallant	Square Sail			12	19	7½	10	16	5½	10	12	5	9	11	6
Main Royal	30	30	20½	12	18	7¾	9	15	5½	8	14	6½	7	13	5
Fore Royal				11	17	6¾	8	14	4½	7	12	5½	7	12	4½
Mizen Royal	Gaff Top Sail			7	12	5½	5	10	3½	5	10	3	4	9	4
Main Stay { Bunt / Aft. Leech	2½	23	16	26	28	13¼	0	22	11	0	12	12	13	14	1½ 9½
Fore Stay	Fore Sail			18	20	11¾	0	16	10	0	12	9	0	9	8
Mizen Stay { Bunt / Aft Leach	1	16	16	19	19	5½ 11	15	17	5 11	12	12	3 8½	9	10	4½ 10
MaTop MaftD° { Bunt / Aft Leach	StormForeSail 1	15	12	21	23	9 23	20	22	7 19	13	13	6½ 12	12	13	6 14
Fore Top Maft Stay	Ring Tail			0	17	17	0	14	13½	0	10	9	0	10	10
Miz. T. Stay { Bunt / Aft. Leach	4½	10½	25	14	14	3 8	12	13	3½ 9	10	11	[illegible]½ 9	9	10	3½ 10
Middle Stay { Bunt / Aft. Leach	Water Sail 5	5	15	20	20	6 10	17	17	4½ 10½	10	10	5 9	12	12	3 7
MaTop Gal. D° { Bunt / Aft Leach	1ft Jib.			18	18	5 10	13	14	4 9	9	9	2 6	8	8	2 6
Main Studding	1	22	20	20	20	13	14	14	12½	13	13	10½	12	12	10½
Fore Studding	2d Jib			19	19	11	13	13	10½	11	11	9	11	11	8½
MainTopMaft Stud.	1	20	19	10	17	16½	10	14	16½	7	9	13½	5	11	13
Fore Top Maft Stud.				9	16	15	9	13	15	6	8	12	4	10	11
MainTopGall. Stud.	3d Jib			7	10	10½	6	10	8½	4	6	7½	4	8	8
ForeTop Gall. Stud.	1	16	16	6	9	9	5	9	7½	3	5	6½	3	7	6½
Flying Jib				0	22	23	0	17	18	0	15	16	0	12	12
Sprit Courfe	Storm Jib			25	25	6½	23	23	6	20	20	5½	18	18	4½
Sprit Top	1	10	10	17	26	12	16	24	10	13	21	9	11	19	8
Driver { Fo. Leech / Aft. Leech				22	28	9 18	15	26	7¼ 20¾	11	15	7 13	12	16	6 15
BoatSa. { Fo. Leech / Aft. Leech	5	7	3¾ 5	SpritSail			5½	6½	5¼ 7¼	0	0	0	Jib	3	4½

IN the merchant-ſervice, the maſting of ſhips often depends upon the fancy of the builder or owner; of courſe, the dimenſions of the ſails muſt correſpondently vary. It would not, therefore, have been attended with great utility, if we had given the dimenſions of ſails to merchant-ſhips of particular tonnages; becauſe ſome maſts houſe more than others, and their heads are of very different lengths. They will be beſt obtained by following the directions for the making of each ſail, as given before in this treatiſe.

It has been ſuggeſted, by a very experienced ſail-maker, that much advantage would frequently reſult to the naval ſervice, if many of the ſails of ſhips were made of equal ſize; ſo that, in caſes of neceſſity, they might be interchangeably uſed. Thus, the mizen-top-ſail being, at preſent, nearly the ſize of the main-top-gallant ſail, there ſeems no reaſon why the yards, maſts, and, of courſe, the ſails, ſhould not be made to ſuit each other.

The main and fore top-ſails only differ, in general, 1 cloth, or about 2 feet, at head and foot, and in depth from 1 to 3 feet: the maſts, yards, and ſails, might here be made alike; as, indeed, is generally the practice in brigs, and was firſt introduced in the North-country trade.

The main and fore top-gallant-ſails differ very little in depth, and only 1 cloth, or about 2 feet, at head and foot: theſe might eaſily be made alike.

The mizen top-gallant-ſail and main and fore royal might be brought to the ſame dimenſions.

The mainſail and foreſail might be made alike as to their head; but, as the mainſail has a gore at the leech and a larger gore at the foot, in order to clear it of the gallows, boats, *&c.* which the foreſail has not, it may be more difficult to arrange them; but, if much convenience is found in the ſails named above, this might be obviated in time.

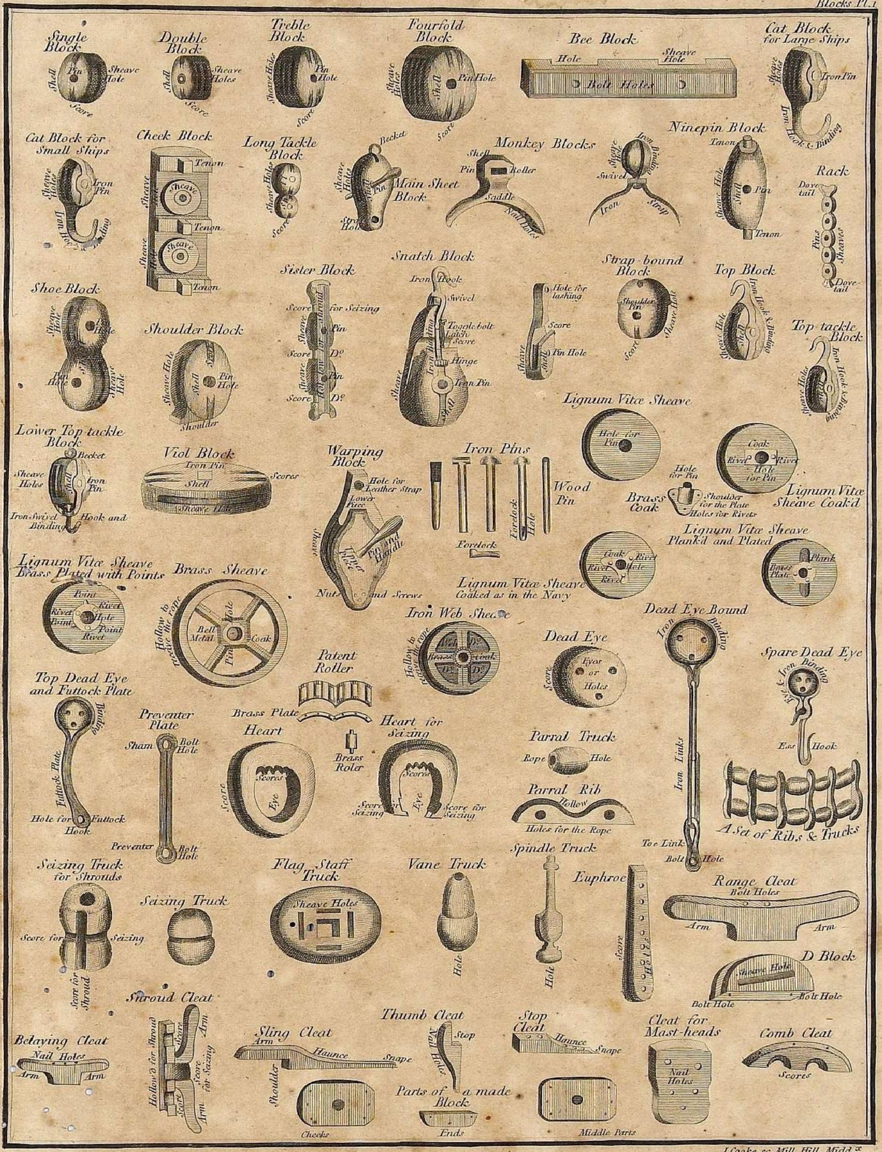
The number of ſails in a veſſel take up conſiderable room; they are put all together, in a ſail-room or cabbin, and create confuſion in getting out; and, in the event of loſing ſails by ſtreſs of weather, and in long voyages, the above alterations might be very uſeful.

The ſpare yards and maſts on-board a ſhip might hence be reduced in number; and, if attention were paid, in the lower-maſts, to captain Pakenham's plan, there ſeldom ſeems a caſe where a veſſel, meeting damage at ſea in her maſts, yards, ſails, or rigging, might not be repaired without going into harbour.

Topmaſt ſtudding-ſails, as well as lower ſtudding-ſails, are occaſionally ſubſtituted for awnings; they might, by a very little attention in planning the rigging of a ſhip, be made ſo as to anſwer both uſes.

Probably theſe hints would be attended with more advantage in the merchant-ſervice than in the royal navy, becauſe a merchant-ſhip is not often ſo plentifully ſtored with ſpare ſails as ſhips of the Britiſh navy.

BLOCK-MAKING.



J. Cooke sc. Mill Hill. Midd.x

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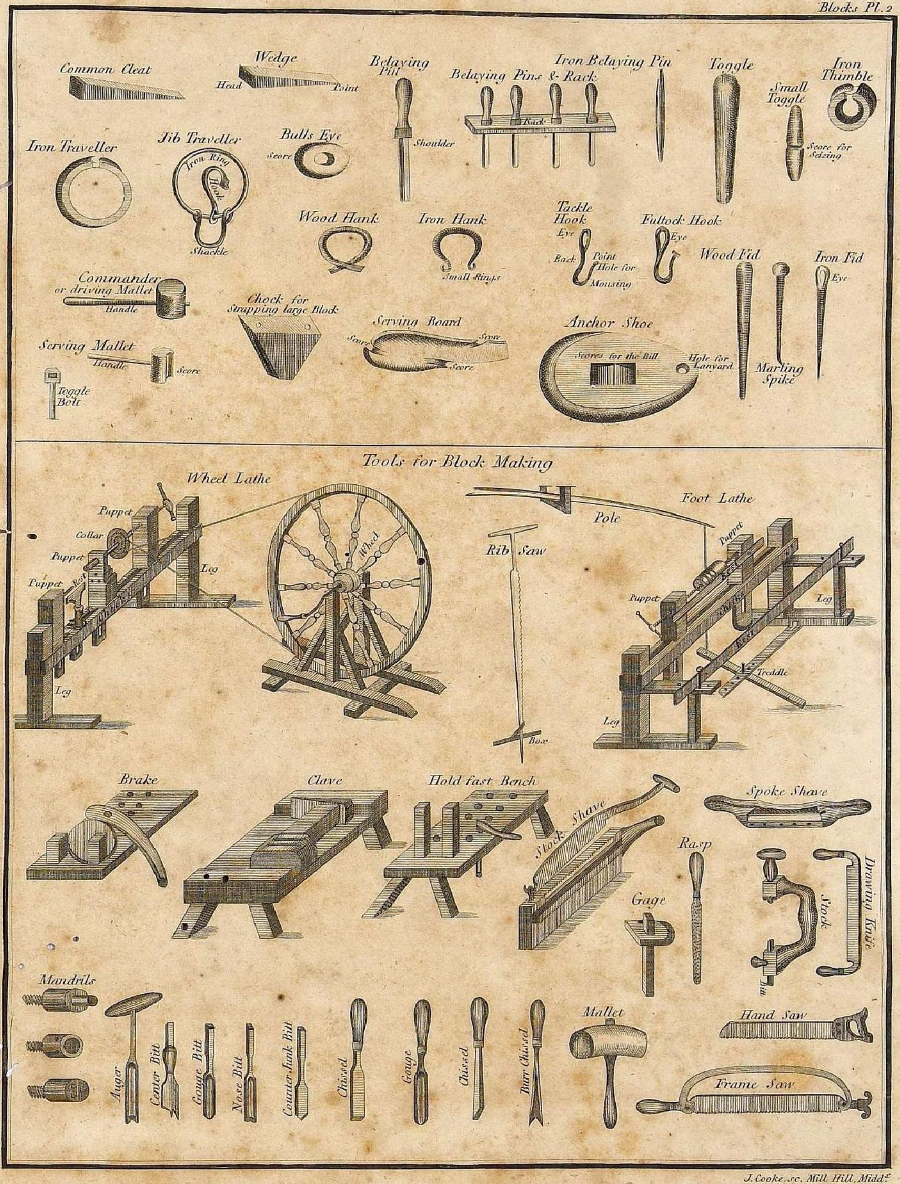

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DESCRIPTION AND USE OF BLOCKS.

THE PLATES OF BLOCKS WILL, UPON REFERENCE, CLEARLY ELUCIDATE THIS TREATISE ON BLOCK-MAKING.

BLOCKS are well known mechanical inſtruments, poſſeſſing the properties and powers of pullies. Theſe powerful inſtruments have from 1 to 8 ſheaves. The blocks in general uſe are, the ſingle block, the double block, the treble block, and the fourfold block; but, when heavy weights or bodies are required to be raiſed or moved, blocks with a greater number of ſheaves are applied, the increaſing power being as two to one for every ſheave moving with the object. Blocks differing from the common ſhape, are the bee-block, (which is made by the maſt-maker,) the cheek-block, the long-tackle-block, the main-ſheet-block, the monkey-block, the nine-pin-block, the rack-block, the ſhoe-block, the ſhoulder-block, the ſiſter-block, the ſnatch-block, the ſtrap-bound-block, the viol-block, and the warping-block. To the blocks may be added the dead eyes, hearts, parrels, trucks, uphroes, cleats, belaying-pins, toggles, thimbles, travellers, bull's eyes, &c. theſe being all furniſhed by block-makers.

The principal parts of blocks are their ſhells, ſheaves, and pins, which are of various ſizes and powers, according to the effect they are to produce.

The dimenſions of the ſhells, and the thickneſs and number of the ſheaves, are proportioned to the ſize of the ropes working in them, and the powers required: the ſheaves turn abreaſt of each other in the ſhell, on one axis or pin, or one above another, on ſeparate pins.

The ſhell is made of elm or aſh, and hollowed between the cheeks, with one or more ſheave-holes to receive the ſheave or ſheaves. On the outſide of the cheeks of blocks that are to be ſtrapped, one ſcore is cut, towards the ends, in which part of the ſtrap is buried; if they are double-ſtrapped, they have two ſcores. A hole is bored through the centre to admit the pin; which, paſſing through both ſides of the ſhell, forms the axis for the ſheaves.

The ſheave is a ſolid cylindrical wheel, and round its circumference is a groove one-third of the thickneſs of the ſheave deep, in which the rope works. It is commonly made of lignum-vitæ; but when for very laborious purpoſes, it is coaked in the middle with metal, or elſe made of caſt metal: if the ſheave is iron, it is coaked with braſs, and if of braſs, with the hardeſt bell-metal. The hole in the centre is ſomething larger than the pin.

The pin is made of lignum-vitæ, cocous, green-heart, or iron, and is the axis on which the ſheaves turn.

DESCRIPTION OF THE TOOLS, AND EXPLANATION OF THE TERMS, USED IN BLOCK-MAKING.

ARSE of a block. The end through which the fall reeves.

AUGER. An iron inftrument to bore holes with; it confifts of a fhank, having at one end a bit, and at the other end an eye to admit a handle, by which it is worked.

BEARDING. Reducing the thicknefs on the fides or edges.

BIT. An iron inftrument refembling the fhank of a gimblet, from 6 to 12 inches long, and from $\frac{1}{2}$ of an inch to 1 inch diameter, and has at its end either a fcrew, a fharp point, or edge, to cut or bore holes with.

BOX of a rib-faw. Two thin iron plates fixed to a wooden handle; in one of the iron plates is an opening to receive a wedge, by which it is fixed to the faw.

BRAKE. An inftrument to confine blocks while boring the hole through the fheave: it is formed of a piece of elm plank, 3 inches thick, about 13 inches broad, and 3 feet long, in which, near one end, are two pegs 2 inches and a half fquare fixed in mortife holes. Two inches from the fide edge, towards the other end, is a double row of holes; to one of thefe holes a brake is attached by a wooden pin, which brake is 2 inches thick, 20 inches long, and 4 inches broad at one end, and tapering to a handle at the other. It is ufed as a lever, by preffing againft it with the knee, and thereby confining the block.

BREAST of a block. The oppofite end to that which reeves the fall.

BURR. A triangular hollow chiffel, ufed to clear the corners of mortifes.

CAP. A femi-circular projection from the fides and round the end of a block above the pin; through it two holes are bored, obliquely from the fides, which meet and form an angle at the end; through thefe holes the ftrap is paffed, to prevent its being chafed.

CHAMFERING. Taking off, or flatting fharp edges.

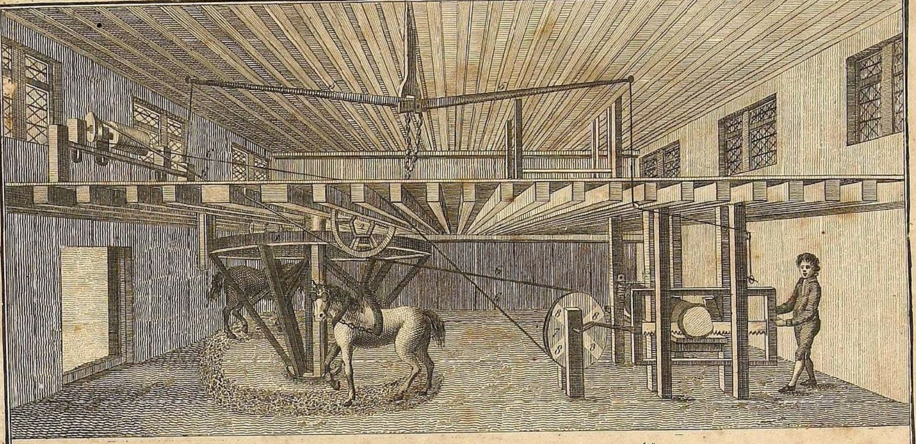
CENTRE-BIT. A bit, having in the middle of its end a fmall fteel point, with a fharp edge on one fide to cut horizontally, and a fharp tooth on the oppofite fide to cut vertically. Holes bored with this inftrument are not liable to fplit.

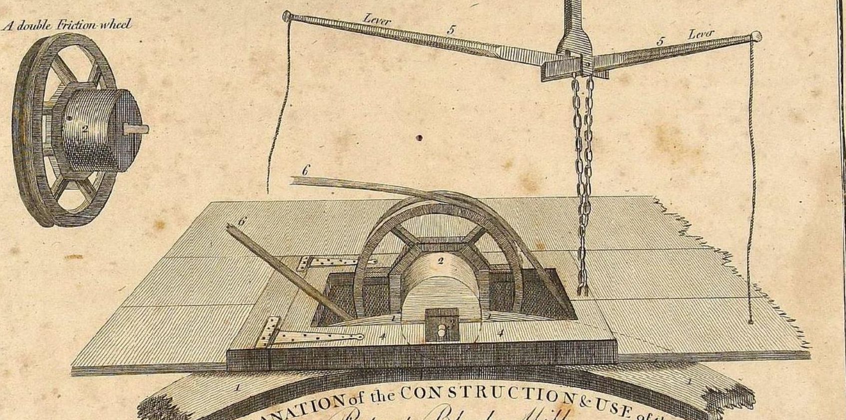
CHEEKS of a block. The two fides of the fhell.

CHISSELS. Sharp edged tools, made of iron and fteel, of different lengths and breadths.

CHOCKS. Cylindrical pieces of wood or iron, fcrew-cut at one end, to fcrew into the end of a mandrel; fome at the other end have a fort of peg to be driven into the work, which is retained by the affiftance of an oppofite centre: fome chocks have, inftead of a wooden peg, three pieces of iron in the end; this fort is chiefly ufed for broad thin work, without an oppofite centre. Iron chocks are fcrew-cut, fimilar to wooden ones, and have a box at the end, into which the work is driven and retained with, or without, an oppofite centre; in the fides of the box are holes to admit a punch, to punch out the work.

THE PATENT BLOCK-MILL.





EXPLANATION of the CONSTRUCTION & USE of the *Patent Block Mill.*

1 The horizontal horse wheel, or great sweep, is from 18 to 20 feet diameter. The upper surface is 9 or 10 Inches broad perfectly smooth and runs correctly horizontal.

2 The Vertical or Friction wheel. Of this there are two sorts double and single: the first runs with two leathers round its circumference, giving motion to two lathes, or to a lathe and a saw frame and is thus constructed. Its centre consists of a solid cylinder of about 20 or 24 Inches diameter and 8 or 9 Inches long, with a surface perfectly smooth the extreme circumference of the wheel is from 3 to 4 feet diameter carries two leathers, by being hollowed towards the middle and rising towards the edges, thus ⌣⌣ by which the leathers running on opposite sides do not interfere with each other the felley is about 5 Inches thick and about 3 Inches deep. The single wheel differs from the other only in the shape of the felly, which has one curvature only thus ⌒ and is about 3 Inches square The Axis of these wheels is of Steel, about one Inch diameter.

3 A Square Iron box inclosing patent rollers, on which the Axis of the friction wheel works. This box is fastened to

4 A frame of Oak, the sides and ends of which are 6 Inches broad and 4 Inches deep the length of the frame in the clear is 6 feet, and its breadth about 15 Inches. This frame is fastened by hinges at one end, to a piece of Oak fixed to the joist or floor; and is occasionally lifted by the lever removing thereby the friction wheel from being acted upon by the great sweep wheel.

5.5 Are the two levers used to lift the friction wheel from the great sweep by a cord from each lever to one lathe or to one saw frame. Thus when the workman wants to stop the machine, he pulls upon the cord, and raising the friction wheel about one Inch from the great sweep, its motion ceases: And when he wishes to renew his work he lets the cord go, and immediately the two wheels coming into contact, the motion is renewed

One disadvantage attends the use of the double wheel, which is that its removal from the great sweep causes the two machines to rest.

6 Are the leather bands, which pass round the friction wheel to the wheel of those Machines which are to be set in motion.

Its uses

From the previous explanation of the construction its uses may be readily conceived Five, six, or seven friction wheels may be adapted to the great sweep in proportion to its size, the power used to turn it, and extent of the building containing it; and these wheels may be double or single — The great ends to which this invention is applied, is the cutting of sheaves by the saw-frame; the turning of sheaves, pins, &c by the common lathes; & the boring of sheaves blocks &c by a lathe with a sliding puppet. It may be necessary here to explain the nature of the lathe with the sliding puppet, & also the constrüction of the saw frame. This lathe differs from the common lathe in this. The puppet, on which the work to be bored is fixed, is larger than ordinary, & slides on brass: it is pulled backward from the mandrel by a weight hanging through a sheave in the leg. There is likewise fixed in the sliding puppet two sheaves, and in the other leg two sheaves; through which a rope passes, having its standing part fixed to the leg, and when its fall is pulled on by the workman it presses the sliding puppet (which has on it the sheave, &c to be bored) towards the bit in the mandrel: and, when the hole is made, the workman lets go the rope & the weight draws back the puppet. The Saw frame is worked by the leather band going round the wheel (7) the parts of which marked 8 are boards 6 or 7 inches wide, which slide in & out being dovetailed They are brought out to a little beyond the edge in order to keep the band from slipping off The timber to be sawed is confined near the saw by chocks & a wedge; & at the other end by means of a screw which pressing down on it prevents its rising.

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CLAVE. A ſtool 14 inches high, made of elm, and ſupported by 4 legs; the top 6 feet long, 2 or 3 feet wide, and 8 inches thick at each end, and only 4 inches thick in the middle, in which the ſhells are ſet up with wedges for making the ſheave-holes.

CLENCH. To make a pin or bolt faſt by battering and ſpreading the point.

COAKING OR BUSHING, is letting through the middle of a ſheave a cylindrical piece of metal, with a hole through its centre, agreeably to the ſize of the pin that is to be admitted as an axis for the ſheave to run on, &c. &c.

COUNTERSUNK. A hollow, cut by a bit round the edge of a hole.

COUNTERSUNK-BIT. A bit having two cutting edges at the end, reverſed to each other, which form an angle from the point.

DRAWING KNIFE. An inſtrument made of a piece of ſteel, 2 inches wide, and 20 inches long; the ends are drawn out fine, bent, and fixed in wooden handles; it is ground to a ſharp edge, and is ſometimes uſed inſtead of the ſtock-ſheave, to pare off the rough wood.

FALL. The rope that with the blocks compoſes a tackle.

FORELOCK. A ſmall wedge of iron driven through a hole near the end of iron pins to keep them from working out.

FRAME-SAW, for two perſons to ſaw with, has an iron bow over the back confined at the ends by rivets: ſome are ſet in motion by a mill, and have wooden frames.

FUTTOCK PLATE, is of iron; the upper part of it is open like a ring, to fix the dead eye in, and a round hole is punched in the lower end of the plate for the futtock-ſhrouds to hook in, or a bolt to be driven through when uſed for the lower ſhrouds.

GAUGE. A wooden inſtrument to mark off diſtances, is a ſquare ſtick 9 inches long, with an iron tooth through one end; this ſtick ſlides through a mortiſe in the middle of a ſemi-circular piece of wood that ſerves as a ſtop, the ſtick being moved at pleaſure.

GOUGES are long, ſharp, circular-edged tools, ſimilar to chiſſels. Gouges and flat tools, uſed in turning, are ſtouter and longer than thoſe uſed with a mallet.

GOUGE-BIT. A bit ſmaller than a centre-bit, with a hollow edge at its end like a gouge.

GREEN-HEART, a wood imported from the Weſt-Indies, uſed for the pins of blocks.

HOLDFASTS to confine the work on the holdfaſt-bench, are made of iron from 15 to 30 inches long, and from half an inch to one inch and a half diameter: this iron is bent at one-third the length, and forms nearly a ſquare; the longeſt part is round, and is called the foot; the ſhorteſt part is flat-tened in the inſide, and is called the head: to confine the work it is put through a hole in the bench.

HOLDFAST-BENCH. A bench of elm plank; its top is 4 feet long, 12 inches wide, and 3 inches thick, with 4 legs 20 inches long; within 4 inches of one end are two upright pieces, 3 inches ſquare, fixed in mortiſes; and along the middle of the bench are two rows of holes, in which the hold-faſt is jambed to confine the work that is to be ſawed or trimmed.

JAMBED. Set faſt with wedges.

LASHING. The rope laſhed to a block for ſecuring it to any object.

MANDREL of the turning lathe. An iron ſpindle, with a ſcrew-cut box at one end, to ſcrew the chock in which confines the work; round the middle of the ſpindle is a collar with a groove, in which the cord works that turns it. It is uſed in a lathe that is worked by a wheel inſtead of a treddle.

MILL. A patent invention uſed by ſome block-makers; it conſiſts of a large horizontal wheel, turned by horſes, which, by means of other wheels, iron cranks, leather bands, &c. gives motion to different turning-lathes and frame-ſaws, that cut the ſheaves, and turn the ſheaves and pins. The plate of this mill more fully deſcribes its conſtruction and uſe.

NOSE-BIT. A bit ſimilar to a gouge bit, having a cutting edge on one ſide of the end.

RASP. A ſort of rough file made of ſteel, with ſhort ſharp teeth upon it. It is fixed in a wooden handle, and is uſed to rub down the edges of the ſhells of blocks, &c.

REAMING. Encreaſing the ſize of a hole by a larger inſtrument.

RIB-SAW is a long narrow ſaw uſed in a pit.

ROLLER, a cylindrical pin turning on its own axis, and is uſed in ſome blocks inſtead of a ſheave.

Patent rollers are made of two parallel circular plates of braſs, about ¼ inch thick. Four or more ſolid braſs cylinders are placed at equal diſtances round theſe plates, and work upon their own axis, between them, at right angles. Thus any pin working through theſe plates of braſs muſt touch the rolling ſurfaces of the ſolid braſs cylinders, by which the friction is conſiderably leſſened.

SADDLE, is that part of a monkey-block which is hollowed out to fit the convexity of the yard, to which it is nailed.

SCORE. A notch or hollow cut by a ſaw, gouge, or chiſſel.

SHACKLE. A ſemi-circular ring of iron, with a hole in each end for a ring or bolt of iron to paſs through, and is uſed to hook or laſh a tackle, &c. to.

SHOULDER. A projection made upon the ſurface of blocks, pins, &c. by reducing one part to a leſs ſubſtance.

SPOKE-SHAVE, a kind of plane to ſmooth and finiſh the ſhells, is a piece of ſteel, 4 or more inches long, and one inch ½ broad; ſharp at one edge as a knife, and ¼ of an inch thick at the back: at each end is left about 2 inches of narrow ſteel, bent up as pegs, by which it is regulated and ſecured in a piece of wood 10 inches long, and narrowed at each end, for handles.

STOCK. A wooden inſtrument to bore holes with, by fixing a bit in the lower end, and a pin with a round head in the other end; the pin and the bit ſerving as an axis to turn it on.

STOCK-SHAVE. A large ſharp-edged cutting knife, with a handle at one end and a hook at the other, by which it hooks in an iron ſtaple that is driven in an elm block; it is uſed to pare off the rough wood from the ſhells of blocks, &c.

STRAP. The circular binding of rope or iron ſurrounding a block, by which it is faſtened with a hook or laſhing to any place.

SWIVEL, any thing which is fixed into another body, in which it turns round.

SWIVEL-HOOK. A hook that turns in the end of an iron block-ſtrap, for the ready taking the turns out of a tackle.

TOGGLE-BOLT. A ſmall iron bolt, having a flat ſquare head, with a hole or eye punched through.

TREDDLE. Two thin battens 4 feet long, laid tranſverſely under the lathe; to the lower batten the cord is faſtened that connects it to the lathe, and the work is put in motion by the preſſure of the workman's foot: the upper batten is fixed at one end to the ground with a thick piece of leather, reſembling a hinge, and at the other end acroſs the under one by an iron pin, for which purpoſe 8 or 10 holes are bored along the middle to regulate it to the work.

TURNING-LATHE, a well known machine for turning ſheaves, pins, &c. is compoſed of two legs 34 inches high, and on each ſide their upper ends is faſtened a piece of oak, called cheeks, about 8 feet long and 5 inches ſquare, and about 3 inches aſunder; between which ſlide two pieces of wood called puppets, that are made to faſten at any diſtance the work may require, by a wedge driven through them under the cheeks. Near the upper part of one is fixed a ſtrong ſharp ſpike of tempered ſteel,

and oppoſite to it in the other is a ſharp-pointed iron ſcrew; between theſe the work is ſuſtained and kept in a circular motion, by means of a cord turned round it, and faſtened above to a pliable pole, and underneath to a treddle moved by the foot: againſt the ſides of the puppets is confined a batten, with a pin through one end, called a reſt, for the workman to keep his tool in a ſteady poſition on. When the work is too heavy for the treddle to perform, a wheel is ſubſtituted, which is turned by one or two handles, and is connected by means of a cord, the ends of which are ſpliced together, and fixed in a groove round the wheel, then croſſed and put round a groove in the collar of the mandrel: to be turned with a ſwift and regular motion.

WEB. The thin partition on the inſide of the rim, and between the ſpokes of an iron ſheave.

THE PRACTICE OF BLOCK-MAKING.

THE proportions for ſingle, double, treble, fourfold, and other blocks, are as follow; viz. the length is 8 times the breadth of the ſheave-hole, which is one-ſixteenth of an inch more than the thickneſs of the ſheave; the thickneſs of the ſheave is one-tenth more than the diameter of the rope it is intended for, and the diameter of the ſheave is five times the thickneſs. The breadth of the block to be ſix times the thickneſs of the ſheave, and the thickneſs to be one half the length, or nearly ſo.

Flat thin blocks are three-eighths of the length thick; but all blocks, having more than one ſheave, encreaſe their thickneſs more than the above proportion, by the additional number of ſheave-holes, and middle-parts or partitions; the thickneſs of each partition to be one-ſixth leſs than the breadth of the ſheave-hole. Theſe are the general dimenſions, but ſometimes vary, according to the uſe intended for.

Very large treble and fourfold blocks are formed of ſeparate pieces, as the cheeks, middle-parts, or partitions, &c. when thus made, they are termed *made-blocks*.

The ſhells of blocks are firſt ſawed to their length, breadth, and thickneſs; and the corners or angles are taken off. They are then delivered to the workman, who firſt gauges the ſize of the ſheave-hole in the middle, one-ſixteenth larger than the thickneſs of the ſheave, and once the thickneſs longer than the diameter, for a ſingle ſheaved block. In blocks of two ſheaves, the middle-part or partition is kept in the middle, and is one-ſixth leſs than the ſheave-hole; each ſheave-hole is gauged equally on each ſide, and ſo for all blocks with a greater number of ſheaves.

The blocks are then jambed up edgeways with wedges in a clave, and the ſheave-holes are made thus: the length and breadth are firſt gouged out, and holes then bored half way through the block, along the part gouged out, with an auger the ſize of the ſheave-hole; the oppoſite ſide is then ſet up, and the ſheave-hole gouged and bored in the ſame manner, to meet the holes on the oppoſite ſide. Blocks from 10 inches and upwards have one hole bored at each end, and cut through with a chiſſel; and the wood is ſawed out with a rib-ſaw. All blocks have the ſheave-holes cleared through by chiſſels; and by burrs at the corners.

Blocks, to have iron ſtraps, ſhould have the ſtrap fitted on before the wood is cut out of the middle.

The hole for the pin is bored through the middle of the block, one-tenth lefs than the diameter of the pin. It is the practice of many block-makers to bore it after the fheave-hole is cut, but it is better to bore it through the folid.

The outfides and edges of the fhell are next rounded off by the ftock-fhave, and neatly finifhed by the fpoke-fhave: as the neatnefs of the finifhing depends upon the ufe the block is defigned for, it refts on the judgement of the workman. In the royal-navy, blocks are left thick upon the edges of the cheeks, but in the merchant-fhips, the edges are fometimes thinned off to a fmall fquare, and fometimes rounded off.

The fcores for the ftraps are gouged out along the outfides of the cheeks, and taper in depth, from nothing at the pin to half the thicknefs of the ftrap at the ends of the block, for a fingle fcore; and the fame on each fide of the pin for a double fcore. The fcores are gouged down, acrofs the breaft of the block, to half the fize of the ftrap, to allow for the ferving.

STRAPPING. A feventeen-inch block has a five-inch rope ftrap, and every inch in length above or under, to a 12 inch block, has half an inch more or lefs fized rope allowed for the ftrap; an 11-inch block has a 3-inch ftrap; a 10 and 9 inch block, 2 inches and a half; an 8 and 7 inch block, 2 inches; a 6-inch block, one inch and a half; a 5-inch block, 1 inch; and a 4-inch block, three-quarters of an inch.

The fcore round iron-bound blocks is taken out to the fize of the iron ftrap, fufficient to bury it, except at the pin.

Iron ftraps are from one-quarter to one inch in thicknefs, and nearly three times the thicknefs in breadth: the thicknefs of iron ftraps fhould be proportioned to the ftrain they are to refift. The cat-block muft have a ftrong ftrap and large iron hook, which hooks the ring of the anchor in catting. The top-block a ftout iron binding, with a ftrong fhort hook. Top tackle-blocks have ftrong iron bindings, the upper block with a tackle-hook, and the lower block with a fwivel-hook.

The fwivel, in iron-bound blocks, is to turn it occafionally, to untwift the parts of the rope that form the tackle, as the mechanical power is greatly reduced thereby.

The fheaves, after the fcore is cut, are fitted: they are folid cylindrical wheels, commonly made of lignum-vitæ, one-tenth thicker than the diameter of the rope intended to run on them, and five times that thicknefs in diameter; they are fawed from the bough or trunk of lignum-vitæ, which muft be matched as near the fize as poffible, for, let the diameter of the piece be what it may, it will make but one fheave, as the heart muft be kept near the centre: the fheaves are cut by hand with a frame-faw, or by a mill, and often at the pit by a pit faw. The hole for the pin fhould be bored through the centre by a bitt fixed in the mandrel of a turning lathe, or with a ftock and bitt, and reamed with an auger one-fixteenth larger than the diameter of the pin, that it may turn eafily; they are then put in a lathe and turned fmooth, and the outer circumference hollowed one-third of its thicknefs, that the rope may embrace it clofely.

Sheaves for very laborious purpofes are made of caft metal, coaked in the middle with hard-bell-metal; fome are made of brafs only, others of iron, with a brafs coak, either open or webbed; and lignum-vitæ fheaves are often coaked, or plated, to make them wear longer and work better.

Coaking or bufhing is letting through the middle of a fheave a cylindrical piece of metal, with a hole through its centre, to admit the pin or axis on which the fheave turns; on each fide of the fheave a plate is let in, having 3 or 4 correfponding holes in each, for rivets to go through, to fecure and ftrengthen the whole. The entrance of the holes in the plates are enlarged, that the heads of the

rivets and points when clenched may have a ſmooth ſurface. When but one plate, the rivets have broad heads; the holes in the ſheave are made accordingly, and the points are clenched on the plate.

The cylinder and one plate are caſt in one piece.

PLANK COAKING is letting in narrow pieces of lignum-vitæ, tranſverſely to each other, one on each ſide of the ſheave; which has likewiſe a ſmall circular braſs plate let in on each ſide, and rivetted through, as others.

PINS OF BLOCKS are made of lignum-vitæ, or cocus; and ſome times, for common blocks, of green-heart, a wood which is imported from the Weſt-Indies: the diameter of the pin is the thickneſs of the ſheave, and is turned in a lathe, except the head, which is left eight-ſquare, to prevent its turning in the block, and is driven through the holes in the block and ſheaves. Braſs, iron, and lignum-vitæ ſheaves, that are coaked or plated, have iron-turned pins, with ſquare heads, and ſometimes a hole in the point, for a forelock, to prevent their coming out.

After the ſheaves are fitted, the inſide of the ſheave-hole, at the arſe of the block, is gouged hollow, to admit the rope, and anſwer with the ſheave; and a ſmall neat chamfer taken off the edges.

MADE-BLOCKS have the ſhell made of ſeveral pieces of elm plank, ſuited to the thickneſs of the cheeks, ſheave-holes, and middle-parts, and are ſtrongly bolted together with three bolts, at each end, driven through and clenched on a ring at the points. Theſe blocks have flatter cheeks and ſquarer edges than other treble and fourfold blocks. Of this ſort are large, treble, and fourfold blocks, for heaving down ſhips or other heavy purchaſes.

Smaller made blocks, of modern invention, are made of two pieces, joining in the middle, and the pin to work on patent rollers, let into the inſide of the cheeks, which are bolted or rivetted together at the ends. Theſe blocks are thought too complex for the royal-navy, and not ſo eaſily remedied in caſe of failure.

Altho' the ſhells of different blocks vary in ſhape, the outſides are finiſhed in a ſimilar manner.

BEE-BLOCKS are made of elm; in length, ſeven-ninths the length of the bee; the depth, two inches for every foot in length; and ſeven-eighths that depth is the thickneſs. It is trimmed ſquare, chamfered on the outſide edges, and fitted with a ſheave in one end: a hole is cut in the other end, to be fitted with a ſheave, ſhould the other fail.

The ſheave-hole is two-ſevenths of the length of the block, and one-fourth the length of the ſheave-hole in breadth, and half the length of the ſheave-hole within the end.

Bee-blocks are bolted to the outer ends of bowſprits, under the bees, and the bolts ſerve as the axis or pin for the ſheaves to work on; the fore-topmaſt-ſtay reeves through the ſheave-hole at the foremoſt end of the ſtarboard bee-block, and the fore-topmaſt-preventer, or ſpring-ſtay, through the ſheave-hole at the after end of the larboard bee-block.

CHEEK-BLOCKS, or half-blocks, are made of elm plank; the length is twice and a half the depth of the topmaſt-head; the breadth is ſeven-eighths of the depth of the topmaſt-head; and the thickneſs half the depth of the topmaſt-head. The depth of each tenon and thickneſs of the cheek, when the ſheave-hole is cut, is each three-eighths of the whole thickneſs, conſequently the remaining $\frac{2}{8}$ is the ſheave-hole. The three tenons to be each two inches ſquare, one in the middle, and one at each end, and the length of the holes to be the thickneſs of the ſheave more than the breadth of the block. The back of the block is divided into three parts, and one-third on each ſide is bearded down to one-third the thickneſs of the cheek on each edge. Pins of iron are made ſuitably to faſten them to the topmaſt-head, and the ſheave-holes are coppered, for durability. Cheek-blocks are bolted to the 'thwartſhip ſides of topmaſt-heads, cloſe up under the cap: the bolts ſerve as the pin or axis for the ſheaves

to work on; the jib-ſtay and haliards, and fore-topmaſt-ſtayſail-ſtay and haliards, reeve through the cheek-blocks at the fore-topmaſt-head, and the main-topmaſt-ſtayſail haliards, and middle-ſtayſail-ſtay and haliards, reeve through the cheek-blocks, at the main-topmaſt-head.

DEEP-SEA-LINE-BLOCKS are the ſame as a wooden ſnatch-block, only ſmaller; generally from 9 to 11 inches long.

D-BLOCKS are lumps of oak in the ſhape of a D, from 12 to 16 inches long, and 8 or 10 inches wide. They are thirded and bearded on the back, and the edges beaded. A ſheave-hole is cut through the middle fore and aft. It is bolted to the ſhip's ſide, in the channels, to reeve the lifts, &c.

LONG-TACKLE-BLOCK. The ſhell is made of aſh or elm, two-thirds longer than the proportion for a ſingle block; as it is ſimilar to two ſingle blocks joined together endways; one to be two-thirds leſs than the other. They are uſed for tackles, and are made agreeably to the ſize of the rope, as other ſingle blocks. They are uſed in the royal-navy, and Eaſt-India ſervice, as yard-tackles; but in the merchant-ſervice, as loading-tackles.

MAIN-SHEET-BLOCK. The ſhell is made of aſh or elm, one-half longer than the proportion for ſingle or double blocks; the additional length is tapered, and a hole bored through between the ſheaves and the end, to admit the ſtrap: the length of the pin is the length of the block, and is ſimilar to a belaying-pin, as it is ſometimes uſed for that purpoſe. They are uſed for the ſheet-tackle of ſmall veſſels' mainſail-booms; are ſingle or double, and the ſheet or fall is always belayed round the pin.

MONKEY-BLOCKS. The ſhells are made of aſh or elm; ſome are only ſmall ſingle blocks, attached by a ſtrap and iron-ſwivel to iron ſtraps that embrace and nail to the yard, the block turning to lead the ſmall running ropes in any direction. Others are nearly eight-ſquare, with a roller working in the middle, the ſame as a ſheave, with a wooden ſaddle beneath, to fit and nail to the yard. This ſort of blocks is ſometimes uſed on the lower yards of ſmall merchant-ſhips, to lead (into the maſt or down upon deck) the running rigging belonging to the ſails.

NINE-PIN-BLOCKS. The ſhells are made of aſh or elm, and reſemble the ſhape of a nine-pin, though flatted on the ſides: their lengths are generally confined to the place they are fixed in, which is moſtly under the croſs-pieces of the forecaſtle and quarter-deck bitts. The breadth of the block, ſheave, &c. is governed by the rope, as the ſingle block, and tapers at the ends to three-eighths of the breadth of the middle: the pin at each end, which ſerves as a vertical axis, is two-thirds the bigneſs of the end. The thickneſs is 5-8ths the breadth. Theſe blocks may be turned in a lathe, and flatted with a ſpoke-ſhave afterwards. They are uſed to lead the running ropes in a horizontal direction.

QUARTER-BLOCK. See thick-and-thin block.

RACK-BLOCKS are a range of ſmall ſingle blocks, made from one ſolid, by the ſame proportions as ſingle-blocks, with ends, in form of a dove's tail, for the laſhing, by which they are faſtened athwart the bowſprit, to lead in the running ropes. They are ſeldom uſed.

SHOE-BLOCKS are two ſingle blocks, cut in a ſolid piece, tranſverſely to each other. They are uſed for legs and falls of the buntlines, but are ſeldom uſed.

SHOULDER-BLOCK is a large ſingle block, left nearly ſquare at the lower end, or arſe of the block, and cut ſloping in the direction of the ſheave. Shoulder-blocks are uſed on the lower yard-arms, to lead in the topſail-ſheets; and, on the topſail-yards, to lead in the topgallant-ſheets; and by means of the ſhoulder are kept upright, and prevent the ſheets jambing between the block and the yard: they are alſo uſed at the outer end of the boomkins, to lead in the fore-tacks.

SISTER-BLOCKS are made of aſh, ſimilar to two ſingle blocks, and are turned out of a ſolid piece, about 20 inches long, one above the other; between the blocks is a ſcore for a middle ſeizing:

a round head is turned at each end, and hollowed underneath, to contain the end ſeizings; along the ſides, through which the pins are driven, is a groove, large enough to receive part of the topmaſt-ſhroud, in which it is ſeized. In theſe blocks reeve the lifts, and reef-tackle-pendents, of the topſail-yards.

SNATCH-BLOCKS are proportioned by the rope, as a ſingle block, leaving twice the length for the ſcore and laſhing; they taper from the ſheave to the laſhing-end, to half the breadth and thickneſs at the ſheave: one ſide of the ſhell is cut acroſs above the ſheave, large enough to admit the rope or fall. In the royal-navy, ſnatch-blocks are iron-bound, terminating at the ſmall end with a ſwivel-hock, or an eye, large enough to receive ſeveral turns of laſhing; that part of the ſtrap, over the notch in the ſide, lifts up with a hinge, and is confined down, when the rope is in the block, by a ſmall iron hook, or latch, that hooks in the eye of a toggle-bolt, and that ſecures the upper end of the ſtrap: the hinged part of the ſtrap goes over the bolt, with a hole in the end; the ſtrap is let into the block its thickneſs, and is confined by the pin and nails: they are uſed for heavy purchaſes, and when a warp, or hawſer is brought to the capſtern. Snatch-blocks, not iron-bound, have a large hole bored through the tapering end of the ſhell, for the laſhing. They are uſed for the main and fore ſheet blocks of ſquare-rigged veſſels.

STRAP-BOUND-BLOCKS are ſingle blocks, with a ſhoulder left on each ſide, at the upper part, to admit the ſtrap through, a little above the pin. Theſe blocks are uſed at the clues of the ſquare-ſails, for the clue-garnets or clue-lines, and under the yards; the ſhoulder ſaves the ſtrap from chafing.

THICK-AND-THIN, OR QUARTER BLOCK, is a double block, with one ſheave thicker than the other, and is uſed to lead down the topſail-ſheets and clue-lines. In the merchant-ſervice they are uſed ſingle, thick and thin.

VOYOL OR VIOL BLOCK is a large ſingle-ſheaved block; the length is 10 times the thickneſs of the ſheave-hole, which is three-eighths more than the thickneſs of the ſheave; the thickneſs of the ſheave is one-tenth more than the diameter of the viol, and the diameter of the ſheave is ſeven times the thickneſs. The breadth of the block to be 8 times the thickneſs of the ſheave, and the thickneſs to be two-ſevenths of the length. This block is double ſcored, the ſheave is coaked with braſs and the pin is iron, and near the thickneſs of the ſheave. It is uſed in heaving up the anchor. The viol paſſes round the jear-capſtern, and through the block, which is laſhed to the main-maſt; and the cable is faſtened in a temporary manner to the viol in ſeveral places. It is ſeldom uſed but in the largeſt ſhips in the royal-navy.

WARPING-BLOCK is made of aſh or elm board, ſhaped ſimilar to the body of a bellows: the ſides or cheeks are 8 inches and a half broad in the middle, and tapered to 2 inches broad at the ends; the back, or longeſt cheek, to be 16 inches long, and ſeven-eighths of an inch thick, with a hole bored through the upper end to receive a leather ſtrap; the upper cheek is 12 inches long, and ſeven-eighths of an inch thick, except the lower end, which is one inch and ſeven-eighths thick, and forms the ſheave-hole. The ſheave is one inch and a quarter thick, and ſeven inches and a half diameter, made of lignum-vitæ, coaked with braſs; it is let into the cheeks one-eighth of an inch, to prevent the yarn getting between the ſheave and cheeks. The cheeks are faſtened together at the lower end with three ſcrews and nuts; and the pin, which is iron, is 7 inches long, driven through the middle of the block, with a ſhoulder on the upper ſide, and clenched at the point on the lower ſide of the ſhell: the upper part of the pin is tapered ſmall, and a wooden handle rivetted thereon. The cheeks have a broad chamfer round the outer edges; the inſide edges, and inſide of the block above the ſheave, are lined with thin iron, neatly ſcrewed on, to prevent the block wearing. This block is finiſhed in a

neater manner than blocks in general, and is ſeldom uſed but by rope-makers, to warp off the yarn into hauls for tarring.

BESIDES BLOCKS, THE FOLLOWING ARTICLES ARE GENERALLY FURNISHED BY BLOCK-MAKERS.

DEAD-EYES are blocks made of elm, without ſheaves, from 4 to 30 inches diameter, and are in thickneſs one inch more than half their diameter. Through the flatted ſides, one-fourth the diameter within the circumference, are bored three holes, which form a triangle, large enough to reeve the laniard. The ſingle hole is placed furtheſt from the reſiſtance, and the edges of the holes, neareſt the reſiſtance, are gouged or ſunk in, to eaſe the ſtrain.

A ſcore is gouged round the middle of the outſide of the dead-eye, large enough to receive half the ſtay, ſhroud, or iron-binding, which is connected to the links.

Dead-eyes, for tops, are fixed in the futtock plates, and uſed by ſome merchant-ſhips for the lower ſhrouds.

Dead-eyes are uſed when the ſtrain is too great to truſt a pin and ſheaves. Spare dead-eyes are iron-bound, with an eye, for the ready hooking, in time of neceſſity, to an iron eſs-hook.

HEARTS. A peculiar ſort of dead-eye, made of elm, from 4 to 40 inches in diameter, ſhaped to reſemble a heart, and flatted on the ſides, through which are gouged a large hole to contain the laniard, that extends the ſtay; the larger the hole the better; ſo that one-third the diameter is left neareſt the ſtrain, decreaſing on the ſides and oppoſite part: four or more grooves are gouged at the edges of the hole, on the broadeſt part, to receive the firſt turns of the laniard, and eaſe the ſtrain: round the outer circumference is gouged a groove, in the middle, to receive the ſtay.

Sometimes hearts are uſed inſtead of dead-eyes, for ſetting up ſhrouds.

BULLS-EYES are a ſort of ſmall oval blocks, without ſheaves, made of hard wood. They are turned in a lathe; have a groove round the outſide, and an oval hole gouged through the middle. They are uſed inſtead of blocks and iron thimbles, but very ſeldom uſed at all.

PARRALS. An aſſemblage of ribs and trucks, which, with the parral rope, form a collar, to attach the upper yards to the maſts, ſo that the yard may ſlide eaſily up or down the maſt.

The rib is made of aſh board, the diameter of the yard in length and one-third the length in breadth. It is ſtraight on the inner edge, and divided into two ſemi-circles on the back, with a hollow cavity between. Through the flat ſides are bored two holes, one in the middle of each ſemi-circle.

The truck is made of aſh, or harder wood, the breadth of the rib in diameter, and one-third more than the diameter in length: it is turned in a lathe; and through the centre, lengthways, is bored a hole to anſwer thoſe in the rib.

Some parrals conſiſt of trucks and a parral-rope only. They are globular, with a hole through the centre for the rope.

TRUCKS. Shroud-trucks are ſhort cylindrical pieces of aſh, or harder wood, turned in a lathe, and a little rounded on the edges, with a hole bored through the centre lengthways, and a groove gouged on the outſide in the ſame direction, to ſuit the ſhroud or rope intended to be ſeized to: round the middle, or at each end, is a ſcore, (turned) for ſeveral turns of ſeizing to lie in; ſome are wooden balls, with a hole through the middle, and grooved round the outſides for the ſeizing to lie in. Trucks for the upper part of maſt-heads, or flag-ſtaffs, are made of elm, the ſize of the top-maſt in diameter, and one-ſixth the diameter in thickneſs: they are turned in a lathe, and reduced to three-fourths of the thickneſs at the edge; have a ſquare mortiſe cut through the middle, to ſuit the head of maſts or ſtaffs, and a ſmall ſheave-hole cut through on each ſide of the mortiſe, for the flag or other haliards.

Trucks, in the royal-navy, have ſmall braſs ſheaves and pins. In the merchant-ſervice, they have only two holes bored through, to reeve the haliards, which traverſes over a rounded piece of wood, nailed acroſs the truck, on the upperſide.

Ornamental trucks, for vanes, are turned in a lathe, moſtly ſhaped like acorns, with a hole bored up the centre, by which they are fixed, and terminate the end of the ſpindle, and prevent the vane ſtock's riſing. Other trucks, for this purpoſe, are longer, and taper more to a point, according to fancy.

UPHROES are oblong blocks, made of aſh, without ſheaves, from 9 to 30 inches long, and 2 to 5 inches diameter; having ſeveral holes bored through the middle at equal diſtances, and grooved round the outſide, to receive the rope by which it is ſuſpended.

They are uſed to ſuſpend the awnings, by extending the ſmall ropes equally, through the holes lengthways, along the middle of the awning: formerly uſed as a fence under the brim of tops, to prevent the foot of the topſail chafing, but are ſeldom uſed now for this purpoſe, except in ſmall veſſels.

CLEATS are made of oak plank, or board, ſawed to the different ſhapes for the uſe deſigned, and then made ſmooth, and finiſhed with gouges, chiſſels, and raſps. The largeſt are called RANGES, or RANGE-CLEATS, for belaying tacks and ſheets to: they are from 3 to 7 inches thick, and ſeven times the thickneſs in length. The arms are each one-third of the length, and made round; the middle, between the two arms, is left ſquare twice the thickneſs in breadth, through which it is bolted, or faſtened; the back is curved in the length, that the arms may riſe from the inſide ſtraight. BELAYING-CLEATS are ſhaped the ſame as range-cleats, but are ſmaller. SHROUD-CLEATS are ſimilar to belaying-cleats, with the addition of an inſide piece, out of the ſame ſolid, long enough to have a ſcore on each ſide of the middle part of the cleat, to contain the ſeizings which faſten it to the ſhroud; the inſide is hollowed to fit the ſhroud, and another ſcore cut acroſs the middle of the cleat for the middle ſeizing: the ſcores are rounded on the outſide edges, and cut deep enough to bury the ſeizing, to prevent its being worn when the rope is belayed.

SLING-CLEATS are made of elm plank, in length once and a quarter the diameter of the yard, in breadth one-fourth the length, and thickneſs two-thirds the breadth. The ſhoulder to be one-third the length of the cleat, and hollowed on the back from the ſhoulder to the end: are uſed as ſtops to the ſtraps of jeer-blocks, &c. to the lower yards.

THUMB-CLEATS are ſimilar to arm-cleats in ſhape, but ſmaller, and are nailed up vertically, to hang any thing on; or horizontally, as ſtop-cleats.

STOP-CLEATS are made of oak plank, or board, of all lengths under 12 inches; the largeſt are commonly for gammoning bowſprits and ſtops to ſtay collars. The breadth to be one-fourth the length; the thickneſs to be two-thirds the breadth; and hollowed on the back. Thoſe for laſhings at the maſt-heads are made of elm, three times the thickneſs in breadth, and once and a half the breadth in length.

COMB-CLEATS are made of aſh, or elm board, have one or more hollow cavities gouged in the middle, and the backs rounded to reſemble a cock's comb.

COMMON-CLEATS are of elm, ſawed tapering on one ſide; are about 3 inches thick, 4 inches broad, and 12 inches long.

WEDGES are made by an axe, or engine, of oak or beech, and are ſimilar to common cleats, but taper on both ſides.

BELAYING-PINS are wooden pins, turned in a lathe, made of aſh, 16 inches long, one inch and three-eighths diameter at the upper end, which is turned as a handle; is three-ſevenths the length, then ſhouldered in to one inch and an eighth diameter.

RACK. A narrow oak board, or rail, containing a number of belaying-pins, which are uſed to belay ſmall running rigging to: ſome belaying-pins are made of iron, and taper each way from the middle, and are driven into racks, boatſkids, or rails.

TOGGLES are turned in a lathe: thoſe for confining the ſtraps of large blocks, as the winding or the fiſh-tackle-blocks, are large tapering aſh or oak pins, from 18 inches to 3 feet long, and one-fifth the length in diameter. Small toggles are little wooden pins, 3 to 9 inches long, and taper each way from the middle, round which is a notch, whereby they are ſeized to the topmaſt croſs-trees, or elſewhere about the rigging.

THIMBLES are circles of iron, made by ſmiths, from 1 to 4 inches diameter; the edges are turned outwards, and form a groove, to contain a rope on the circumference.

TRAVELLERS are circles of iron, made by ſmiths, ſimilar to thimbles, but larger, and much lighter: they are to facilitate the deſcent of topgallant-yards by the backſtays, &c. Jib-traveller is an iron ring, five-eighths to one inch and a half thick, and the diameter once and a quarter the diameter of the jib-boom, with a hook and ſhackle that ſlide on the ring.

HANKS are made of narrow hoops, or tough wood, bent round and confined at the ends by notches: they are to haſten the deſcent of ſtayſails, being fixed on the ſtay, and the head of the ſail bent to the hanks. There are iron hanks ſimilar in ſhape to the former, but open at the lower part, to go over the ſtay; made broader in the middle than at the ends, which cauſes them to ſpring to their ſhape; the ends are drawn out fine, and turned into a ſmall ring, for ſecuring the head of the ſail by the ſeizing. Iron hanks are moſtly to the foreſails of veſſels with one maſt.

IRON HOOKS, for tackles, are made with an eye to receive the thimble, and taper at the point: they are hollow on the back, that a ſeizing may lie on them, without ſlipping; or a catſpaw hitch: a hole is generally punched through the point, for mouſing. Iron hooks, for the futtock-ſhrouds, have a ſquare point, to prevent their unhooking.

FIDS are tapered pins, made of wood or iron; the wood are turned in a lathe. Splicings-fids are made of cocus, and are uſed for ſtrapping blocks, and ſplicing the running rigging. Setting-fids made of aſh, are uſed for ſetting blocks in the ſtraps. Cable and Stay-fids, made of elm, uſed in ſplicing ſtays and cables. Thoſe made of iron are ſhort and thick, ſometimes having an eye in the largeſt end, and are commonly curved near the point.

MARLINE-SPIKE is made of iron, ſmaller than a fid, with a round knob at the head, and is uſed as the ſplicing-fid.

MALLETS are cylindrical pieces of wood, with a wooden handle fixed in the centre, and are made of aſh or other hard wood; uſed for driving on the heads of chiſſels or gouges. Serving-mallets, have a ſcore gouged out along the ſide, for ſerving of ropes. Driving-mallets, or Commanders, are about 20 inches long, and 8 or 10 inches diameter, with a handle 3 times the diametes in length: uſed for driving in large fids, and to beat up the fall round a capſtern.

CHOCK. A ſquare tapering piece of elm; it is one-fourth longer than the ſize of the baſe, or butt end, with a hole bored through the ſides: uſed in ſtrapping large blocks.

SERVING BOARD is a tapering thin piece of board, with a ſmall ſcore gouged at the end and ſides. It is uſed for ſerving ſmall ropes.

SHOES FOR ANCHORS are oval pieces of elm plank, about 2 feet long, ſawed out, and rounded on the underſide with an adze: in the middle of the upperſide a double ſcore is taken out with a chiſſel, 2 inches broad; ſunk three-fourths of an inch each way from the middle, that it may catch the bill in either direction: at the ſmall end is bored a hole for a laniard. It is placed under the bill of the anchor, when removed from one place to another, to prevent its tearing the ſhips ſides or deck.

A TABLE of the Contract-Prices of BLOCKS for the ROYAL-NAVY,

MADE IN THE YEAR 1791, AND STILL UNALTERED.

SPECIES OF BLOCKS.	SIZE.	PRICE FOR EACH.
	Inch.	£ s. d.
Treble careening, planked & plated, without Sheaves	38	8 8 0
	34	7 15 0
Double Ditto - - - - -	42	4 17 0
Iron Bolts to D° 8 to a set. per Set		0 15 0
Single planked and plated - -	32	2 10 0
Iron Bolts to Ditto. per Set		0 7 6
Viol, planked and plated -	44	2 11 0
	40	2 6 4
Single Snatch, with Brass coaked Sheaves - -	32	2 19 9
	31	2 19 0
	30	2 18 0
	29	2 17 0
Single for Topmast Stays -	20	1 4 10½
	18	0 18 6
	17	0 16 11½
	16	0 14 4½
	15	0 12 5½
	14	0 11 4
	12	0 7 6
	11	0 5 10½
Hallyards thin & Toptackle -	11	0 5 0
	10	0 3 10
	9	0 3 0
Single Brass coaked - - -	5	0 1 0
Clue Garnet Ditto - -	6	0 1 6
	5	0 1 6
	[illegible]	0 1 6
Ditto with Wooden Pins -	6	0 0 10
	5	0 0 10
	4	0 0 8
Euphroes, 29 and 30 Inches, and upwards. per Foot -		0 2 3

BLOCKS, With Lignum-vitæ or Cast-iron Sheaves Brass-coaked, and turned Iron Pins.

SIZE.	Single of all Sorts.	Cluegarnet and Topsail. Sheet.	Cluegarnet and Topsail. Sheet & Tack	Hallyard thin & Long-tackle.
Inch.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
6	0 1 4	—	—	—
7	0 1 11¼	0 2 1	0 2 1	—
8	0 2 3½	0 2 5½	0 2 5½	—
9	0 3 2	0 3 5	0 3 5	—
10	0 4 3	0 4 7¼	0 4 7¼	—
11	0 5 4	0 5 10½	0 5 10½	Hallya. thin
12	0 6 11½	0 7 6	0 7 6	0 6 7½
13	0 8 8	0 9 6¾	0 9 6¾	0 8 2
14	0 10 6½	0 11 4	0 11 4	0 9 6½
15	0 11 5	0 12 5½	0 12 5½	0 10 9½
16	0 13 6	0 14 4½	0 14 4½	0 13 6
17	0 15 8½	—	0 16 11½	0 14 2¾
18	0 17 4½	—	0 18 6	0 14 10½
19	1 1 4½	—	1 2 5¼	0 18 7½
20	1 3 9¼	—	1 4 10½	1 0 3¼
21	1 7 0¾	—	1 10 4	1 4 8½
22		—	—	—
23	1 11 7	—	1 13 2¼	1 6 0
24	2 1 3	—	2 2 11	1 7 0
25	2 4 1½	—	2 5 6½	1 8 1¼
26	2 8 1	—	2 10 3	1 10 2
27	2 10 9¾	—	—	Longtackle 2 9 1¾
28	2 16 0	—	—	2 16 0
29	—	—	—	2 17 0
30	—	—	—	2 18 0
31	—	—	—	2 19 0
32	—	—	—	2 19 9
33	—	—	—	3 0 0
34	—	—	—	3 1 0
35	—	—	—	3 2 0
36	—	—	—	3 3 0
37	—	—	—	3 4 0
38	—	—	—	3 5 0

DEAD-EYES.

SIZE.	SHROUD, per Foot.	STAY, per Foot.
Inches.	£ s. d.	£ s. d.
3	0 0 7	—
4	0 0 8	0 1 0
5	0 0 8	0 1 0
6	0 0 8	0 1 0
7	0 0 9	0 1 2
8	0 0 9	0 1 2
9	0 0 10	0 1 2
10	0 0 10	0 1 2
11	0 0 11	0 1 3
12	0 0 11	0 1 4
13	0 1 0	0 1 4
14	0 1 2	0 1 6
15	0 1 3	0 1 6
16	0 1 4	0 1 8
17	0 2 0	0 1 8
18	0 2 0	0 2 0
19	—	0 2 0
20	—	0 2 0
21	—	0 2 6
22	—	0 2 6
23	—	0 2 6
24	—	0 2 6
25	—	0 2 8
26	—	0 2 8
27	—	0 2 8
28	—	0 2 10
29	—	0 2 10

TRUCKS, &c.

	Inch.	£ s. d.
Trucks - each		0 0 2½
Rib Parrels -		0 0 0¾
Trucks for Shrouds and Awnings -		0 0 2
Trucks for Top-Gallant Mast-Heads	19	0 3 6
	18	0 3 0
	17	0 2 0
	7	0 0 8
	6	0 0 8

All Lignum-vitæ Sheaves Brass-coaked, and Cast-iron Sheaves Brass-coaked, with turned Iron Pins, One Shilling per Pound.

All double Blocks are charged at the Price of Two single Blocks; Treble Blocks at the Price of Three single; and fourfold Blocks at the Price of Four single Blocks.

☞ Ten per Cent. is deducted from the above Prices in Peace, and 6 per Cent. added to the above Prices during War.

RIGGING.

RIGGING.

ALTHOUGH the mafts, yards, fails, blocks, and ropes, do altogether compofe what may be called the RIGGING OF A SHIP, or VESSEL; yet the mode of applying the ropes to the feveral other parts, and combining the whole, fo as to produce the means of navigating the veffel, is likewife termed, RIGGING A VESSEL; and of rigging, in this latter fenfe, we are now about to treat.

There are two fpecies of Rigging: one called STANDING-RIGGING; the other RUNNING-RIGGING.

Ropes ufed to fuftain the mafts remain fixed; as fhrouds, ftays, and back-ftays: fuch are called ftanding-rigging.

The ropes leading through various blocks, and to different places of the mafts, yards, fails, and fhrouds, and which are moved according to the various operations of navigation, fuch as the lifts, braces, fheets, tacks, haliards, clue-lines, bunt-lines, leech-lines, bow-lines, fpilling-lines, brails, down-haulers, &c. are called running-rigging.

Thefe general ideas of rigging may fuffice. For the more eafy and accurate knowledge of this fcience we now commence with an

EXPLANATION OF THE TERMS USED IN RIGGING.

ARM-GASKET. See GASKETS.

ARM-CLEAT. See CLEATS.

AWNING. A canvas covering, expanded over the decks of a fhip, to fcreen the crew from, and prevent the decks fpliting by, the heat of the fun.

BACK-STAYS. See STAYS.

BAG-REEF. See REEF.

BALANCE-REEF. See Reef.

BECKETS. Large iron hooks, or ſhort ropes, uſed in ſeveral parts of a ſhip to confine large ropes, &c. or to hang up the weather-ſheets and lee-tacks of the main and fore ſail to the foremoſt main and fore ſhrouds. Some beckets have an eye ſpliced in one end, and a ſmall walnut-knot crowned at the other, and ſome have both ends ſpliced together like a wreath. The nooſe made at the breaſt of a block, to make faſt the ſtanding part of a fall-to, is alſo called a becket.

BELAYING. Faſtening a rope, by giving it ſeveral croſs turns alternately round each end, of a cleat, pin, &c.

BELL-ROPE. See Ropes.

BELAYING-CLEAT. See Cleats.

BELAYING-PINS. See Pins.

BENDING. Faſtening one rope to another, or to different objects, and faſtening a ſail to its yard.

BENDS. The ſmall ropes uſed to confine the clinch of a cable.

BENTINCK-SHROUDS. See Shrouds.

BIGHT. The nooſe, or doubled part of a rope when folded.

BILL-PENDENT. See Pendent.

BITTS. A frame compoſed of two upright pieces of timber, called the pins, and a croſs piece faſtened horizontally on the top of them: they are uſed to belay cables and ropes to. Bowline and Brace Bitts are ſituated near the maſts; the Fore-jeer and Topsail-sheet bitts are ſituated on the forecaſtle and round the fore-maſt; the Main-jeer and Topsail-sheet-bitts, tenon into the fore-maſt-beam of the quarter-deck; the Riding-bitts are the largeſt bitts in a ſhip, and thoſe to which the cable is bitted when the veſſel rides at anchor.

BIT-STOPPER. See Stopper.

BLOCKS. Machines uſed in ſhips, &c. to encreaſe the mechanical power of ropes. *See the treatiſe on blocks.*

BLOCK-AND-BLOCK. The ſituation of a tackle when the effect is deſtroyed by the blocks meeting together.

BOARDING-NETTING. See Netting.

BOATSKIDS. Long ſquare pieces of fir, extending acroſs the ſhip from the gang-boards, and on which the boats, ſpare maſts, &c. are ſtowed.

BOBSTAY. See Stay.

BOLSTERS. Bags filled with rope-yarn, or ſhakings, which are placed under the ſhrouds and ſtays, to prevent their chafing againſt the treſtle-trees.

BOLT-ROPE. The rope ſewed to the edges of ſails.

BOOMS. Long poles run out from the extremities of the yards, bowſprits, and ſides of the maſts, to extend the feet of particular ſails. The Driver-boom, on which the foot of the driver, or ſpanker, is extended, is attached to the mizen-maſts, and the outer end hangs over the ſtern. The Jib-boom is run out from the outer end of the bowſprit, and extends the foot of the jib. The Main-boom, uſed in veſſels of one or two maſts, is ſimilar to the driver-boom of a ſhip, and on this is ſpread the foot of the main-ſail. The Ringtail-boom is a ſmall boom projecting from the ſtern of ſome veſſels to ſpread the foot of the ringtail-ſail; and alſo a ſmall boom, laſhed occaſionally to the outer end of the main-ſail-boom, to ſpread the foot of the ringtail-ſail when hoiſted at the after-leech of fore and aft main-ſails. The Square-sail-boom is laſhed acroſs the deck of veſſels with one maſt, to ſpread the

foot of the ſquare-ſail. STUDDING-SAIL-BOOMS, to ſpread the ſtudding-ſails, ſlide through boom-irons at the extremities of the yards, and from the veſſels' ſides.

BOOM-IRONS. Two flat iron rings formed into one piece, one above the other; employed to connect the booms to the yards, &c. the lower ring is the largeſt, and is driven on the yard: ſome boom-irons faſten on the yards with a crotch or ſtrap, ſecured by nails and hoops.

BOOM-TACKLE. See TACKLE.

BOWSING. Hauling or pulling upon a rope or fall of a tackle to remove a body, or increaſe the tenſion.

BOWLINE. See LINES.

BOWLINE-BITTS. See BITTS.

BOWLINE-TACKLE. See TACKLE.

BOWSPRIT. The large boom or maſt which projects over the ſtem. *See the treatiſe on maſts.*

BOWSPRIT-HORSES. See HORSES.

BOWSPRIT-NETTING. See NETTING.

BOWSPRIT-SHROUDS. See SHROUDS.

BRACE. A rope to turn the yards and ſails horizontally about the maſts, and ſhift them when neceſſary. PREVENTER-BRACE. A rope uſed in ſhips of war, to ſupply the place of a brace, ſhould that be ſhot away or damaged. They are led the contrary way, to be leſs liable to detriment at the ſame time.

BRACE-BITTS. See BITTS.

BRACE-PENDENTS. See PENDENT.

BRAILS. Ropes paſſing through blocks on the gaff, and faſtened to the after-leech of fore and aft main-ſails, to truſs or brail them up. Similar alſo are the brails of ſtay-ſails.

BREAST-ROPE. See ROPE.

BREAST-WORK. The rails and ſtantions on the foremoſt end of the quarter-deck and poop.

BREAST-WORK-NETTING. See NETTING.

BRIDLES. Short ropes, or legs, which faſten the bowlines to the cringles on the leeches of ſails.

BUMKINS OR BOOMKINS. Short booms projecting from each ſide of the bow to haul down the fore-tack.

BUMKIN-SHROUDS. See SHROUDS.

BUNT-GASKET. See GASKET.

BUNTLINES. See LINES.

BURTONS. See BURTON TACKLES.

BUOY-ROPE. See ROPE.

BURTON-PENDENTS. See PENDENTS.

BURTON-TACKLE. See TACKLE.

BUTTON AND LOOP. A ſhort piece of rope, having at one end a walnut knot, crowned, and at the other end an eye. It is uſed as a becket to confine ropes in.

BUTTONS. Small pieces of thick leather under the heads of nails that are driven through ropes.

CABLET. Any cable-laid rope under nine inches in circumference.

CAPS. Short thick blocks of wood, with two holes in them, uſed to confine the maſts together. *See the treatiſe on maſt-making.*

To CAP a rope. To cover the end with tarred canvas, which is whipt with twine or ſpun-yarn.

CAPSTERN. A machine for heaving up anchors, or other great ſtrains.

CAST-OFF. To looſe a rope, by unſeizing it, or by cutting the laſhing.

CATHARPINS. Short ropes, to keep the lower ſhrouds in tight, after they are braced in by ſwifters, and to afford room to brace the yards ſharp.

CATFALL. The rope that forms the tackle for heaving up the anchor from the waters' edge to the bow. It reeves through the ſheaves at the outer end of the cat-head, and through the ſheaves of the cat-block alternately.

CHAIN-BOAT. A large boat fitted with a davit over its ſtem, and two windlaſſes, one forward, and the other aft, in the inſide. It is uſed for getting up mooring-chains, anchors, &c.

CHAIN-PLATES. Thick iron plates bolted to the ſhip's ſides, and to which the chains and dead-eyes that ſupport the maſts by the ſhrouds are connected.

CHAINS, or CHANNELS, or CHAINWALES. Broad thick planks, bolted edgeways againſt the ſhip's ſides, abreaſt and abaft the maſts, uſed to extend the ſhrouds from each other, and from the head of the maſts.

CHEST-TREES. Narrow pieces of oak plank, fitted and bolted to the top-ſides of veſſels abaft the fore-channels, with a ſheave in the upper end; it confines the clues of the main-ſail, by hauling home the main-tack through the ſheave.

CHOAKING the LUFF. Placing the bight of the leading part, or fall of a tackle, cloſe up between the neſt part and jaw of the block.

CHOCK. A thick triangular piece of wood, faſtened in a temporary manner in the ſtrap at the arſe of the block: on the baſe of the chock-wedges are driven to force the block into its place.

CLAMP. A crooked iron plate, faſtened to the after-end of the main-cap of ſnows, to ſecure the tryſail-maſt.

CLASP-HOOP. See HOOP.

CLEATS. Pieces of wood of various ſhapes, uſed for ſtops, and to make ropes faſt to, viz. ARM or SLING-CLEATS are nailed on each ſide of the ſlings of the lower yard, and have an arm at one end, which lies over the ſtraps of the jeer blocks to prevent their being chaffed. BELAYING-CLEATS have two arms, or horns, and are nailed through the middle to the maſts, or elſewhere, to belay ropes to. COMB-CLEATS are ſemi-circular, and are hollowed in the middle to confine a rope to one place. RANGE-CLEATS are ſhaped like belaying-cleats, but are much larger, and are bolted through the middle. SHROUD-CLEATS have two arms, ſimilar to belaying-cleats; the inſide is hollowed to fit the ſhroud, and grooves are cut round the middle and ends to receive the ſeizings, which confine them to the ſhrouds. STOP-CLEATS are nailed to yard-arms, to prevent the ſlipping of the rigging and the gammoning, and to ſtop collars on maſts, &c. THUMB-CLEATS are ſhaped like arm-cleats, but are much ſmaller.

CLINCH. That part of a cable which is faſtened to the ring of an anchor, &c.

CLOATHING THE BOLSTERS. Laying ſeveral thickneſſes of worn canvas, well tarred, over them, to make an eaſy bed for the ſhrouds.

CLUE-GARNETS. Tackles connected to the clues of main and fore courſes, to truſs the ſail up to the yard.

CLUE-LINES. See LINES.

COIL. Rope laid in regular folds for the convenience of ſtowage, and hanging upon cleats, to prevent its being entangled.

COLLAR. The upper part of a ſtay; alſo a rope formed into a wreath, by ſplicing the ends together, with a heart, or dead-eye, ſeized in the bight, to which the ſtay is confined at the lower part.

COMB-CLEAT. See CLEATS.

CRINGLES. Small loops made on the bolt-rope of a ſail; uſed to faſten different ropes to, hook the reef tackles to, for drawing the ſail up to its yard, to faſten the bridles of the bowline to, and to extend the leech of the ſail, &c.

CROSS-JACK-YARD. See YARD.

CROTCHES. Pieces of wood or iron, the upper part of which is compoſed of two arms, reſembling a half-moon. They are chiefly uſed to ſupport ſpare maſts, &c.

CROSS-TREES. Short flat pieces of timber, let in and bolted athwartſhips to the treſtle-trees, at the maſt-head, to ſupport the tops, &c.

CROW-FOOT. An aſſemblage of ſmall cords, which reeve through holes, made at regular diſtances through the uphroe: its uſe is to ſuſpend the awnings, and keep the foot of the top-ſail from ſtriking under the tops.

CROWN OF THE CABLE. The bights which are formed by the ſeveral turns.

CROWNING. The finiſhing of a knot made on the end of a rope.

CUNTLINE. The intervals between the ſtrands of a rope.

DAVIT. A ſhort boom fitted in the fore-channel, and uſed as the arm of a crane to hoiſt the flukes of the anchor clear of the ſhip's ſide, till high enough to lay on the gunwale, and faſtened by the ſhank-painter.

DAVIT-ROPE. See ROPE.

DEAD-EYES. Round flat wooden blocks, with three holes inſtead of ſheaves, through which the laniards reeve, when ſetting up the ſhrouds, or ſtays. The power gained by dead-eyes, is as the number of parts of the laniards rove through them; but, if the laniards be not well greaſed, the power will be greatly loſt by friction, ſo that they are never applied as purchaſes, but merely for the better keeping the quantity gained of any ſhroud, or ſtay, when ſet up, and are much ſtronger than blocks with ſheaves, when ſtrain lies on a ſingle pin.

DECK-STOPPER. See STOPPER.

DERRICK. A tackle uſed at the outer quarter of a mizen-yard, conſiſting of a double and ſingle block, connected by a fall; alſo a *diagonal* ſhore, as a ſupport to ſheers; alſo a ſingle ſpar, top-maſt, or boom, raiſed upright, and ſupported by guys at the head, from whence hangs a tackle over the hatchway, the heel working in a ſocket of wood faſtened on the deck.

DOG-STOPPER. See STOPPER.

DRIVER-BOOM. See BOOM.

DRIVER-YARD. See YARD.

DOLPHIN. A rope laſhed round the maſt as a ſupport to the pudding.

DOWNHAULER. A rope which hoiſts down the ſtay-ſails, ſtudding-ſails, and boom-ſails, to ſhorten ſail, &c.

EARINGS. Small ropes employed to faſten the upper corners of ſails.

EASE-OFF, OR VEER-AWAY. To ſlacken a rope gradually.

ENTERING-ROPE. See ROPE.

EYE OF A SHROUD. The upper part, which is formed into a ſort of collar to go over the maſt heads.

EYELET-HOLES. The holes made in the head and reefs of ſails.

FAKE. One of the turns of a rope when ſtowed, or coiled.

FALL. The rope that connects the blocks of a tackle; but the fall ſometimes implies only the looſe part which is pulled upon to produce the deſired effect.

FANCY-LINES. See LINES.

FANGS OR LEE-FANGS. A rope faſtened to a cringle, near the foot of a ketche's wing-ſail, to haul in the foot of the ſail for lacing on the bonnet, or taking in the ſail.

FENDERS. Pieces of wood, or old cable, bags of old rope-yarn, ſhakings, cork, or other materials, hung by a laniard over a veſſel's ſides, to prevent her being damaged.

FID. A ſquare bar of iron, or wood, driven through a hole in the heel of a top-maſt, when raiſed at the head of a lower-maſt; it, reſting on the treſtle-trees, ſupports the top-maſts, &c. The top-gallant-maſt is retained in the ſame manner at the head of the top-maſt, and the royal maſt above that.

FIDS. Round tapering pins of various ſizes, made of iron, or hard wood, and uſed for ſplicing of cordage.

FISH-TACKLE. See TACKLE.

FISH-TACKLE-PENDENTS. See PENDENTS.

FLAG-STAFF. See STAFF.

FLAG-STAFF-STAYS. See STAYS.

FLEETING. Changing the ſituation of a tackle, by placing the blocks further aſunder, the force being deſtroyed by the blocks meeting, called block-and-block.

FLEMISH HORSES. See HORSES.

FLY OF A FLAG. The oppoſite part to the hoiſt.

FLYING OF SAILS. Setting them in looſe a manner; as royal ſails without lifts, or ſheets, the clues being laſhed; as ſmall topgallant-ſails, jibs, without ſtays; and as ſtudding-ſails without booms.

FORE-TOPGALLANT-STAY-TACKLE. See TACKLE.

FOUL implies entangled, as the tackle is when twiſted. The Cables are FOUL, when twiſted round each other, by a veſſel's turning round the anchors by which ſhe rides.

FOXES. Twiſted rope-yarns; uſed for making of rope bands, &c. &c.

FRAPPING. Taking ſeveral turns round the middle of a laſhing, or any number of ropes, and drawing the ſeveral parts tight together.

FURLING. Wrapping, or rolling a ſail cloſe up to its yard, maſt, or ſtay, and faſtening it up with gaſkets, lines, &c.

FURLING-LINE. See LINES.

FUTTOCK-PLATE. A narrow plate of iron, having a dead-eye bound in the upper end. An eye is made in the lower end, which is put through a mortiſe in the ſides of the top, to hook the futtock-ſhroud to.

FUTTOCK-SHROUD. See SHROUD.

FUTTOCK-STAVE. A ſhort piece of rope ſerved over with ſpun-yarn, to which the ſhrouds are confined at the catharpins.

GAFF. A pole uſed to extend the mizen courſe of a ſhip, and the fore and aft mainſails of ſmaller veſſels.

GAMMONING. The rope which binds the inner quarter of the bowſprit cloſe down upon the ſtem, that it may reſt well in its bed.

GANGWAY-NETTING. See NETTING.

GASKETS. Braided cordage uſed to confine the ſail to the yard, when furled, &c. ARM-GASKETS; thoſe gaſkets uſed at the extremities of yards. BUNT-GASKETS are thoſe uſed in the middle of yards. QUARTER-GASKETS; thoſe uſed between the middle and extremities of the yards.

GIRT-LINES. See LINES.

GRIPES. Short ropes with dead eyes, uſed to confine the boats to the deck.

GROMMETS. Rings made of worn rope, which are uſed to confine the nock of ſpritſails to the maſt, and the oars of boats to the pins, inſtead of rowlocks, &c.

GUEST-ROPE. See ROPE.

GUYS. Ropes to keep ſteady ſheers, davits, or derricks, when charged with any weighty body.

GUY-PENDENTS. See PENDENTS.

HAGSTEETH. Thoſe parts of pointing, matting, or the like, which are intertwiſted with the reſt in an irregular manner.

HALIARDS. Ropes or tackles employed to hoiſt or lower yards, ſails, and flags, upon the maſts, yards, ſtays, &c.

HAND-TIGHT. A moderate degree of tenſion on a rope, as to make it ſtraight.

HANKS. Rings made of iron, or hoopſticks bent in a circular form, fixed on the ſtays to confine the ſtayſails.

TO HAUL. To pull on a rope.

HEAD-LINE. See LINES.

HEAD-NETTING. See NETTING.

HEART. A peculiar ſort of dead-eye, reſembling a heart: it has one large hole in the middle, to contain the laniard, by which the ſtays or ſhrouds are extended.

HEAVER. A ſhort wooden ſtaff, uſed as a lever in ſetting up the topmaſt-ſhrouds, ſtrapping of blocks, and ſeizing the rigging, &c.

HEAVING. The act of turning about a capſtern, &c. by means of bars, or handſpikes.

HEEL-ROPE. See ROPE.

HITCH. A nooſe, by which one rope is faſtened to another, or to ſome object, as a ring, poſt, timber-head, &c.

HOIST OF A FLAG OR SAIL. That part which is towards the ſtaff, or bent to a maſt or ſtay.

HOISTING. Drawing up a weight by tackles.

HOLDING-ON. The act of pulling back and retaining any quantity of rope, acquired by the effort of a capſtern, or tackle; alſo the end of a ſtopper, nipper, &c. held by the hand.

HOOPS. Thin bars of iron, of circular, and other ſhapes. CLASP-HOOPS are ſimilar to other hoops, but open with a hinge. BUOY-HOOPS are the wooden hoops that confine the buoy; and the wreaths of rope that go round the buoy, to which the ſtraps are faſtened. WOODEN-HOOPS are thoſe which encircle maſts, and to which the fore-leech of ſome ſails are bent.

HORNS. The jaws, or ſemi-circular inner ends of booms and gaffs.

HORSE. A machine with which the operation of woolding is performed.

HORSES. Ropes for the men to ſtand upon, or hold by, &c. BOWSPRIT-HORSES are made faſt at the ends, at a parallel height from the bowſprit, and ſerve as rails for the men to hold by, when going out upon the bowſprit. FLEMISH-HORSES are ſmall horſes under the yards without the cleats.

JIB-HORSES hang under the jib-boom, and are knotted at certain diftances, to prevent the men's feet flipping. TRAVERSE-HORSES are of rope, or iron, for fails to travel on, &c. The one of rope is thick, and extended up and down, parallel to the maft; that on the fore-fide is for hoifting or lowering the fquare-fail, whofe yard is attached to the horfe by a traveller, and flides up and down occafionally. The horfe fixed abaft the maft is for the tryfail of a fnow, which flides up and down with hanks as a ftayfail. This is feldom ufed but in floops of war, which occafionally affume the form of fnows. HORSES OF IRON are thick iron rods, faftened at the ends athwart the deck of fingle-maft veffels, before the maft, for the forefail-fheet to travel on; and that abaft the maft, acrofs the infide of the ftern, on which travels the main-fheet-block. YARD-HORSES are ropes depending from the yards, for the men to ftand upon in loofing, reefing, or furling the fails.

HOUNDS. That part of the maft-head which gradually projects on the ftarboard and larboard fides, beyond the cylindrical furface below.

HOUSE-LINE. See LINES.

JACK-BLOCK. A fmall block feized to the topgallant-maft-head, for fending the topgallant-yards up and down.

JAMBED. Obftructed and rendered immoveable.

JAWS. Two cheeks, forming a femi-circle, which enclofe the after-part of the maft, fo as to confine, by the help of the parral, the inner end of the boom or gaff.

JEARS. Tackles for hoifting or lowering the lower yards.

JEAR-BITTS. See BITTS.

JEWEL-BLOCKS. Small blocks, feized to eye-bolts in the extremeties of the upper yards, for hoifting the ftudding-fails by the haliards, which reeve through them.

JIB-BOOM. See BOOM.

JIB-HORSES. See HORSES.

JIGGER. A fhort rope fitted, with a block and a fheave, for holding on the cable as it is hove in by a windlafs.

JIGGER-TACKLE. See TACKLE.

INHAULER. A rope employed to haul in the jib-boom, &c.

IRON-HORSES. See HORSES.

JUNK. Short pieces of old cable, ufed for mooring fhips' fterns, or cut into fmaller portions for making mats, rope-bands, points, gafkets, &c.

KECKLING. Any old rope wound about a cable, to preferve the furface of it from chafing.

KEVELS. Two crooked pieces of timber, whofe lower ends reft in a ftep or foot nailed to the fhip's fides; the heads branch out like horns, to belay ropes to.

KINKING. The curling up of a rope when twifted too hard, or drawn haftily out of the coil.

KNOTS. The faftenings by which one rope is joined to another; or the knobs formed on their ends to prevent their flipping.

LACING. Faftening the head of a fail to a maft, yard, gaff, &c. by a line turned fpirally round them, and reeved through the eyelet-holes in the fail. When a fail is laced to a maft, it is beft to take crofs turns, backwards and forwards, on the fore-fide of the maft only, fo that the fail may flide up or down.

LANIARDS. Short fmall ropes to make faft the fhrouds, ftays, &c.

LASHERS. The ropes employed to lafh, or fecure particular objects, as jears, &c.

LASHING. Faftening or fecuring one thing to another, with feveral turns of a rope.

LEADING-PART. That part of a tackle which is hauled upon.

LEGS. Short ropes which branch out into two or more parts, as the bowline-legs or bridles, buntline-legs, crowfoot-legs, &c.

LIFE-LINES. See LINES.

LIFTS. Ropes which fuspend the outer-quarters of the yards, and raife or lower them. STANDING-LIFTS are made faft, and belong to yards that never require to be topped.

LINES. Cordage fmaller than ropes, and formed of two or more fine ftrands of hemp; as HOUSE-LINE, made of three ftrands, ufed to feize blocks into their ftraps and the clues of fails; and to marl the fkirts of fails to their bolt-ropes, &c. LOG-LINE, made of three or more ftrands, and ufed for the log, &c. MARLINE, made of two ftrands, and ufed for the fame purpofes as houfe-line.

Some ropes are, from their fituations, termed lines; as BOWLINES, BUNTLINES, CLUE-LINES, FANCY-LINE, FURLING-LINE, GIRT-LINE, HEAD-LINE, LEECH-LINES, LIFE-LINES, NAVE-LINE, SLAB-LINE, SPILLING-LINES, TOW-LINE, and, TRACING-LINE.

BOWLINES are faftened on and near the middle of the leech of fquare fails, by two or three fubordinate parts, called bridles; and are ufed to brace fideways, or clofe-haul to the wind, the weather, or windward, leeches of the fails forward; which are kept fteady by the tenfion of the bowline. BUNTLINES are ropes faftened to the foot of fquare fails, to haul them up to their yards. CLUE-LINES are fimilar to the clue-garnets, and are ufed to fquare fails in general; whereas clue-garnets are confined to the main and fore courfes. FANCY-LINE is a rope ufed to overhaul the brails of fome fore and aft fails. FURLING-LINE is a fmall rope, or a line, ufed to faften fmall fails to the yards, when furled. GIRT-LINE is a rope reeved through a fingle block, occafionally lafhed to maft and fheer heads, to hoift up rigging, &c. HEAD-LINE is the line fewed along the upper edge of flags to ftrengthen them. LEECH-LINES are ropes ufed to trufs up the fails. LIFE-LINES, for the prefervation of the feamen, are worn hawfer-laid rope: they make faft with two half hitches round the ftrap of the lift-block and jeer, or tye-blocks in the middle of the yard. NAVE-LINE is a tackle depending from the maft-head to the truffes, to keep them oppofite the yards, whilft hoifting or lowering. SLAB-LINE is a rope ufed to trufs up the foot of the main and fore courfes occafionally, for the pilot or mafter to look forward underneath, as the fhip advances. SPILLING-LINES are ropes reeved through blocks, lafhed on each fide of the quarter-blocks of the lower yards, then lead down before the fail, return upwards under the foot, and make faft round the yard with a timber hitch: fpilling-lines of topfails have two legs, which are each made faft with a timber-hitch round the quarters of the topfail yards, then lead down on the aftfide, return upwards under the foot of the fail, and reeve through a block on the forefide, lafhed to the tye-block on the yard, and then lead upon deck abaft the maft. TOW-LINE is a fmall hawfer, ufed to remove any veffel, by means of anchors, capfterns, &c. TRACING-LINE is a fmall rope or tackle ufed to hoift any object to a higher ftation, and render it more convenient; fuch are the tracing-lines of the yard-tackles; the inner tracing-line hoifts the block, and the outer tracing-line, the parts of the tackle.

LIZARD. An iron thimble fpliced into the main-bowlines, and pointed over to hook a tackle to.

LOG-LINES. See LINES.

LOOP. A noofe made in a rope.

LOOSING THE SAILS. Unfurling them for fetting, or for drying, when wet.

LOWER SHROUDS. See SHROUDS.

LOWER STAYS. See STAYS.

LUFF TACKLE. See TACKLE.

MAIN-STAY-TACKLE-PENDENTS. See PENDENTS.

MAIN-BOOM. See BOOM.

MAN-ROPES. See Ropes.

MARLINE. See Lines.

MARLING-SPIKE. A tapered iron pin, with a globular head, ufed to make openings between the ftrands of ropes for introducing the ends of others through them: it is fometimes ufed as a lever to ftrain tight feizings, &c.

MARTINGAL. An afh bar, fixed downwards from the fore-fide of the bowfprit-cap, and by which the martingal-ftay fupports the jib-boom.

MASTS. Long cylindrical pieces of timber, to which are faftened the yards, fails, and rigging. *See the treatife on mafts.*

MARTINGAL-STAY. See Stay.

MAST-COATS. Coverings made of well tarred canvas to prevent the water going down the maft-hole.

MAT. A thick texture made of fpunyarn, ftrands of rope, or foxes, wove or plaited together, and faftened upon mafts, yards, &c. to prevent their chafing.

MESSENGER. A cable-laid rope, ufed to heave in the cable.

MESHES. The fpaces between the lines of a netting.

MOUSE. A large knob, in the fhape of a pear, formed on ftays; alfo a fmaller one round meffengers, by intertwifting a fmall rope round the ftrands.

MOUSING A HOOK. Taking feveral turns of fpunyarn round the back and point of a hook, and faftening it, to prevent its unhooking.

NAVE-LINE. See Lines.

NETTING. A fence made by feizing together the bights of fmall ropes, leaving uniform fpaces or mefhes between: it is ufed in different parts of a fhip; thus, the Boarding-netting is thrown over the fides, to prevent the enemies boarding. Bowsprit-netting is faftened at the outer end of the bowfprit to the horfes, or man-ropes, to ftow away the fore-topmaft-ftayfail and jib. Breastwork, Gangway, Quarter, and Waist Nettings, are ufed to keep the hammacoes in the ftantions. Head-netting is faftened to the horfes in the head and upper rail, to fave the men from flipping overboard. Quarter-deck-netting is fufpended over the officers heads, to prevent any thing falling thereon, in time of action. Top-netting is faftened to the rail, fhrouds, and top, to preferve the men from falling.

To NIPPER or NIP ropes, is to ftop them with feveral turns of rope-yarn, or fpun-yarn, round each, and the ends made faft.

NIPPERS. Braided cordage 12 or 14 feet long, ufed in heaving in the cable by the viol, or meffenger.

NORMAN. A fhort wooden bar, with a head, ufed in one of the holes of the windlafs, when there is little ftrain on the cable.

OAKUM. Old ropes untwifted and picked fmall.

OVERHAULING. Extending the feveral parts of a tackle, or ropes, connected to blocks or dead-eyes, to any diftance required.

OUTHAULER. A rope made faft to the tack of the jib, to haul it out by.

PAINTER. A rope fecured to the bow of a boat to make her faft with.

PANCH. A covering of wood, or a thick texture made of plaited rope-yarn, larger than a mat, to preferve the mafts, &c. from chafing.

PARCELLING. Wrapping worn canvas round ropes, to prepare them for ferving.

PARRAL. A fort of collar, by which the yards are faftened at the flings to the mafts, fo that they may be hoifted or lowered with facility. Of parrals there are four forts, viz. one fort is formed

of a ſingle rope, covered with ſpunyarn or leather, and having an eye ſpliced in each end; another ſort is formed of two ropes, which reeve alternately through a rib and truck, and have an eye in one end; a third ſort, calculated to confine the jaws of a jib-boom to the maſt, is formed of a rope which reeves through ſeveral trucks without ribs; and a fourth ſort is formed of a truſs, by which the yard may at any time be ſlackened from the maſt, or may be confined cloſe by tackles connected to their lower ends, which lead upon deck, and are moſt convenient for the lower yards. The firſt and ſecond ſorts are uſed for topſail and topgallant yards.

PARRAL-TRUCKS. See TRUCKS.

PASSAREE. Any rope faſtened round the cat-head and fore-tack, to keep tight the leech of the ſail in light winds.

To PAY OUT. To let a cable or other rope run out of the veſſel.

PEEK-HALIARDS. The ropes by which the outer end of a gaff or yard, that hangs oblique to a maſt, is hoiſted.

PENDENTS. Large, but ſhort, ropes which go over the maſt-heads, and to which are hooked the main and fore tackles. There are, beſides, many other pendents, with a block or tackle attached to one end, all of which ſerve to tranſmit the effort of their tackles to ſome other object: ſuch are the BILL-PENDENT, BRACE-PENDENTS, PREVENTER-BRACE-PENDENTS, BURTON-PENDENTS, FISH-PENDENTS, GUY-PENDENTS, MAIN-STAY-TACKLE-PENDENT, PENDENTS OF TACKLES, QUARTER-TACKLE-PENDENTS, REEF-TACKLE-PENDENTS, RUDDER-PENDENTS, STAY-TACKLE-PENDENTS, TOP-ROPE-PENDENTS, TRUSS-PENDENTS, VANG-PENDENTS, WINDING-TACKLE-PENDENTS, and YARD-TACKLE-PENDENTS.

PINS, for belaying ropes to, are turned wooden pins, with a ſhoulder near the middle; the ſmall end is driven through the rough tree rails, or racks of thin plank made on purpoſe. Iron belaying-pins are round, taper from the middle to each end, and are driven in the rails, or racks, to belay the ropes to, by taking ſeveral croſs turns about them.

POINTING. Tapering the end of a rope, or ſplice, and working over the reduced part a ſmall cloſe netting, with an even number of knittles twiſted from the ſame, to prevent the end untwiſting, and to go more eaſily through a block or hole.

POINTS. Short pieces of braided cordage plaited together.

PORT-TACKLE. See TACKLE.

PREVENTER. An additional rope employed, ſometimes to ſupport or anſwer the purpoſe of another that has a great ſtrain or is injured. Such are the PREVENTER-BRACES, SHROUDS, STAYS, &c.

PREVENTER-STAYS. See STAYS.

PREVENTER-SHROUDS. See SHROUDS.

PREVENTER-STAY-TACKLE. See TACKLE.

PREVENTER-BRACE-PENDENT. See PENDENTS.

PUDDENING. A thick wreath, made of rope, faſtened about the main and fore maſts of a ſhip, to prevent their yards from falling down, when the ropes that ſupport them are injured.

QUARTER-CLOTH. Canvas nailed with ſennit along the rough-tree-rail on the quarter-deck, and to the plank-ſheer, to keep out the ſpray of the ſea.

RACK. A ſhort thin plank, with holes made through it, containing a number of belaying-pins, uſed inſtead of cleats: it is ſeized to the ſhrouds, and nailed over the bowſprit or windlaſs.

RACK. A long ſhell, containing a number of ſheaves, formerly fixed over the bowſprit to lead in the running rigging; at preſent, wooden ſaddles, with holes in them, are nailed on the bowſprit for this purpoſe, being more out of the way, and leſs liable to be out of order.

RACKING A TACKLE. Faſtening together the fall of a tackle, or any two ropes, by paſſing two or more croſs turns with rope-yarn round each part, and as many round turns above them; making faſt the ends with a reef-knot.

RANGE-CLEATS. Large cleats, with two arms, bolted in the waiſt of ſhips, to belay the tacks and ſheets to.

RATLINGS. Small ropes which croſs the ſhrouds horizontally, at equal diſtances from the deck upwards, forming ladders to go up or down from the maſt-heads.

REEF. That portion of a ſail contained between the head or foot, and a row of eyelet-holes parallel thereto, which portion is taken up to reduce the ſurface of the ſail when the wind encreaſes. Sails, according to their ſizes, have from one to four reefs. A BAG-REEF is the fourth, or lower, reef of a topſail. A BALANCE-REEF croſſes boom-mainſails diagonally, from the nock to the end of the upper reef-band on the after-leech.

REEF-TACKLE. See TACKLE.

REEF-TACKLE-PENDENTS. See PENDENTS.

To REEVE. To paſs a rope through a block or hole.

RELIEVING-TACKLES. See TACKLES.

RIBS OF A PARRAL. Short flat pieces of wood, having a hole near each end, through which the parral-rope is reeved.

RIDING-BIT. See BITS.

RIDGE-TACKLE. See TACKLE.

RING-TAIL-BOOM. See BOOM.

RING-ROPE. See ROPES.

RING-BOLT. An iron bolt, with a ring fitted in an eye in the end.

ROLLING-TACKLE. See TACKLE.

ROPE-BANDS. Braided cordage, uſed to faſten the heads of ſails to their reſpective yards.

ROPES. All cordage in general above one inch in circumference, which bear different names, according to their various uſes. BELL-ROPE is hawſer-laid rope, 9 or 12 feet in length, which bends round a thimble in the eye of the bell-ſtrap or crank. In the middle of the rope is a diamond knot, and at the end a double wall knot, crowned. BOLT-ROPE, is the rope ſewed to the ſkirts, or edges of ſails. BUOY-ROPE, a rope faſtened to the buoy of the anchor. BREAST-ROPE is faſtened along the laniards of the ſhrouds, for ſafety, when heaving the lead in the chains. DAVIT-ROPE, the laſhing which ſecures the davit to the ſhrouds, when out of uſe. ENTERING-ROPES hang from the upper part of the ſtantions, along-ſide the ladder, at the gangways. GUEST-ROPE is faſtened to an eye-bolt in the ſhip's ſide, and to the outer end of a boom projecting from the ſhip's ſide, by guys, to keep the boats clear off the ſides. HEEL-ROPE is to haul out the bowſprits of cutters, &c. MAN-ROPES are for the ſecurity of the men, when going out on the bowſprit. PARRAL-ROPES are to connect the ribs and trucks of parrals together. PASSING-ROPES lead round the ſhip, through eyes in the quarter, waiſt, gangway, and forecaſtle ſtantions, forward to the knight-heads.

RING-ROPES are occaſionally made faſt to the ring-bolts in the deck, and, by croſs turns round the cable, to confine it ſecurely in ſtormy weather. SLIP-ROPE is to trice the bight of the cable into the head; and is alſo employed in caſting off a veſſel, till got in a tide's way, &c. TILLER-ROPE is the rope by which the tiller is worked. TOP-ROPE, is a rope reeved through the heel of a topmaſt, to raiſe it by its tackle to the maſt-head.

ROPE-YARN. One of the threads of which a rope is compoſed.

ROUGH-TREE-RAIL. A rail, breaſt high, along the ſides of the poop and quarter-deck.

ROUNDING. Serving the cable with worn rope, or ſennit to ſecure it from chafing.

ROWSING. Pulling upon a cable or rope, without the aſſiſtance of capſterns, &c.

ROYAL-STAY. See STAY.

ROYAL-YARD. See YARD.

RUDDER-COATS. Coverings made of well tarred canvas, to prevent the water from coming in at the ruder-hole.

RUDDER-TACKLE. See TACKLE.

RUDDER-PENDENTS. See PENDENTS.

RUNNER. A ſingle rope, connected with a tackle, which tranſmits its effort the ſame as if the tackle was the whole length; ſuch are the BREAST-BACKSTAY-RUNNER, RUNNERS OF TACKLES, &c.

RUNNING-RIGGING. All that part of rigging which traverſes through blocks, &c.

SADDLES FOR BOOMS. Small blocks of wood, hollowed on their lower and upper ſides, and nailed on the yards and bowſprits, for retaining booms in a ſteady poſition. The lower-ſide is hollowed, to fit the convexity of the yard it is intended for; and the upper-ſide to the figure of the boom, as a channel for it to ſlide on. SADDLES, on the bowſprit, for leading the rigging through, are ſemi-circles made to fit the convex ſurface of the bowſprit; they are rounded on the back, and have ſeveral holes made in the ſides, through which the rigging is led, when they are nailed to the inner part of the bowſprit.

SAILS. *See the treatiſe on ſails.*

SEIZING. Joining two ropes, or the two ends of one rope, together, &c. by taking ſeveral cloſe turns of ſmall rope, line, or ſpunyarn, round them. END-SEIZING is a round ſeizing on the end of a rope. THROAT-SEIZING is the firſt ſeizing clapt on where a rope, or ropes, croſs each other. MIDDLE-SEIZING, is a ſeizing between a throat and end ſeizing. EYE-SEIZING, is a round ſeizing next the eye of a ſhroud, &c.

SELVAGEE. Several rope yarns turned into a circular form, and marled together with ſpunyarn. It is uſed to attach the hook of a tackle to any rope, ſhroud, or ſtay, to extend, or ſet them up: two or more turns of the ſelvagee are taken round the ſame, in which the hook is fixed.

SENNIT. Braided cordage, formed of rope-yarn.

SERVING. Encircling a rope with line or ſpunyarn, &c. to preſerve it from being chafed.

SERVING-MALLET. A cylindrical piece of wood, with a handle in the middle: it is uſed for ſerving, and has a groove along the ſurface oppoſite to the handle, which fits the convexity of the rope to be ſerved.

SETTING THE SAILS. Looſing and expanding them.

SETTING-UP. Encreaſing the tenſion of the ſhrouds, ſtays, and backſtays, to ſecure the maſts by tackles, laniards, &c.

SHACKLE. A ſort of iron ring, to hook a tackle to.

SHANK-PAINTER. A ſhort rope and chain bolted to the ſhip's ſides, above the fore channels, to hang or ſecure the ſhank of an anchor to; the flukes reſting in a chock on the gunwale.

SHEEP-SHANK. A ſort of knot made on backſtays, &c. to ſhorten them.

SHEET. A rope or tackle faſtened to the clues of ſails, to retain them in any direction.

SHEET-STOPPERS. See STOPPERS.

SHIFTING-BACKSTAY-TACKLE. See TACKLE.

SHROUDS. A range of large ropes, extended from the maſt-heads to the larboard and ſtarboard ſides of the veſſel, to ſupport the maſts, &c.

The ſhrouds are denominated from the places to which they belong; thus: the fore, main, and mizen ſhrouds; fore, main, and mizen-topmaſt ſhrouds, &c.

The number and ſize of the ſhrouds are in proportion to the ſize of the maſts, as in the annexed Tables of Dimenſions.

BOWSPRIT-SHROUDS, are thoſe which ſupport the bowſprit. BUMKIN-SHROUDS, are thoſe which ſupport the bumkins. FUTTOCK-SHROUDS, are ſhrouds which connect the efforts of the topmaſt ſhrouds to the lower ſhrouds. BENTINCK-SHROUDS, are additional ſhrouds, to ſupport the maſts in heavy gales. PREVENTER-SHROUDS, are ſimilar to bentinck-ſhrouds, and are uſed in bad weather to eaſe the lower rigging.

SHROUD-TRUCKS. See TRUCKS.

SHROUD-STOPPERS. See STOPPERS.

SLINGS. Short ropes, uſed to hang the yards to the maſts, &c. or to encircle a bale or caſk, and ſuſpend it whilſt hoiſting or lowering; and alſo to ſecure buoys, &c.

To SLUE. To turn a maſt, or boom, about in its cap, or boom-iron, &c.

SNAKING. A ſort of faſtening to confine the outer turns of ſeizings, &c.

SNAKING THE STAYS, or ropes, on the quarters, inſtead of netting, is ſeizing proportioned ſized rope, at angles, from one ſtay or rope to the other, alternately, in a parallel direction along the whole length. Its uſe to ſtays is, that one part may remain perfect and independent of the other, ſhould it be ſhot away.

SNOTTER. A ſhort rope, ſpliced together at the ends, and ſerved with ſpunyarn, or covered with hide: it is ſeized to the ſize of the maſt, leaving a bight to fit the lower end of a ſprit, which it confines to the maſt.

SPANS. Short ropes, having a block, thimble, or eye, ſpliced into each end; the middle is hitched round a maſt, yard, gaff, cap, or ſtay, from whence the ends branch out. Spans are ſometimes faſtened at both ends, and have a block in the bight. They are uſed to lead ropes through, which paſs through the blocks or thimbles, to encreaſe power, or to prevent their ſwinging about.

SPANNING OF BOOMS. Confining them by ropes.

SPANNING OF RUNNERS. Taking ſeveral turns with ſmall rope round both runners abaft the maſt, and frapping the turns.

SPANISH WINDLASS. See WINDLASS.

SPARS. Small fir-trees.

SPILLING-LINES. See LINES.

SPLICING. Joining one rope to another, by interweaving their ends, or uniting the end of a rope into another part of it. There are different ſorts of ſplices, viz. the CUNT-SPLICE, which forms an eye in the middle of a rope: the EYE-SPLICE forms an eye or circle at the end of a rope on itſelf, or round a block, &c. The LONG-SPLICE is made to rejoin a rope or ropes intended to reeve through a

block without encreaſing its ſize: the SHORT-SPLICE is made by untwiſting the ends of a rope, or of two ropes, and placing the ſtrands of one between thoſe of the other. The TAPERED-SPLICE is chiefly uſed on cables, and is made as the ſhort-ſplice, but is gradually tapered toward each end, by cutting away ſome of the rope-yarns, and is ſerved over: the DRAWING-SPLICE, is a ſplice uſed for joining cables together, and is eſteemed the beſt for this purpoſe, as it may be readily undone.

SPRIT. A ſmall yard, or pole, by which ſpritſails are extended. The foot of it is fixed in a SNOTTER, which encircles the maſt, and it croſſes the ſail diagonally, the upper end being attached to the peek.

SPUNYARN. Two or more rope-yarns twiſted together.

SQUARE-RIGGED. A term applied to thoſe ſhips which have long yards, at right angles with the length of the keel, and low maſts: it is thence uſed in contra-diſtinction to thoſe veſſels whoſe ſails are extended by ſtays, latteen-yards, &c.

SQUARE-SAIL-BOOM. See BOOM.

STAFF. A light pole on which the flags are hoiſted. The ENSIGN-STAFF, is the principal ſtaff. and is erected on the ſtern, within-ſide the taffarel, to diſplay the enſign. FLAG-STAFFS are alſo erected on the maſt-heads, or formed by the upper part of the topgallant maſts, to hoiſt the flags, royals, &c. The JACK-STAFF is a ſhort ſtaff erected on the aftſide of the bowſprit-cap, to expand the jack.

STAGE. A ſmall platform made of grating, or of ſhort boards, for men to ſtand upon to fix the rigging toward the outer end of the bowſprit, &c.

STANDING-PART. That part of a tackle which is made faſt.

STANDING PART OF A ROPE, (in the making of knots, &c.) means the principal part of a rope, in contra-diſtinction to the end by which the knot is formed; or it may be ſaid to be that part of a rope which is at reſt, and is acted upon by the end.

STANTIONS OF THE NETTINGS. Square wooden pillars, let into the upper part of the ſhip's ſide, or ſmall pillars of iron, uſed to ſupport the nettings, awnings, &c.

STAYS. Strong ropes, to ſupport the maſts forward, which extend from their upper part, at the maſt-head, toward the fore part of the ſhip. The ſtays are denominated from the maſts, LOWER-STAYS, TOPMAST-STAYS, TOPGALLAN-STAYS, FLAGSTAFF or ROYAL STAYS, &c.

BACKSTAYS, BREAST, SHIFTING, and STANDING, are ſtays which ſupport the topmaſts and topgallant maſts from aft; they reach from the heads of the topmaſt and topgallant-maſt to the channel on each ſide of the ſhip, and aſſiſt the ſhrouds when ſtrained by a preſs of ſail. The ſhifting backſtays change according to the action of the wind upon the ſails, whether aft, or upon the quarter. BOB-STAYS, are ſtays uſed to confine the bowſprit down upon the ſtem, and counteract the force of the ſtays, which draw it upwards. STAYSAIL-STAYS, are thoſe ſtays on which the ſtayſails are extended. The JIB-STAY is ſimilar to the ſtayſail-ſtays, and extends the jib. The MARTINGAL-STAY ſupports the jib-boom, as the bobſtays ſupport the bowſprit. PREVENTER-SPRING-STAYS, are ſubordinate ſtays to ſupport their reſpective ſtays, and ſupply their places in caſe of any accident. SKIATIC-STAYS are ropes uſed for hoiſting, or lowering, burdens in or out of ſhips.

STAYSAIL-STAY-TACKLE. See TACKLE.

STAY-TACKLE-PENDENTS. See PENDENTS.

STERNFAST. A rope to confine the ſterns of boats, &c.

STIRRUPS. Short ropes, which have their upper ends plaited and nailed round the yards: eyes are made in their lower ends, through which the horfes are reeved, to keep them parallel to the yards.

STOOLS. Small channels, fixed to the ſhip's ſides, to contain the dead-eyes for the backſtays.

STOP. Several turns of ſpunyarn taken round the end of a rope, ſimilar to a ſeizing, to faſten it to another rope. Alſo, a projection left on the upper part of topgallant-maſts, &c. to prevent the rigging from ſliding down.

STOPPERS. Short ropes, uſed to check the cable, ſuſpend weighty bodies, and retain the ſhrouds, &c. in a fixed poſition, after being damaged, or otherwiſe. ANCHOR-STOPPERS are uſed to ſuſpend the anchor, when catted: BIT-STOPPERS are thoſe ſtoppers uſed to check the cable: DECK-STOPPERS are uſed to retain the cable when the ſhip is riding at anchor: DOG-STOPPERS are uſed as additional ſecurities when the ſhip is riding in heavy gales, or bringing up a ſhip with much ſternway, to prevent the cable from ſnapping at the bitts, and to eaſe the deck-ſtoppers: WING-STOPPERS are uſed for the ſame purpoſes as dog-ſtoppers: SHROUD-STOPPERS are uſed to confine a ſhroud together, when damaged, or ſhot. FORE-TACK, and SHEET, STOPPERS, are for ſecuring the tacks and ſheets, till belayed.

STRAPS. Wreaths of ropes which are ſpliced round blocks, or uſed to encircle a yard or any large rope, by which tackles, &c. may be connected to them.

STUDDINGSAIL-BOOM. See BOOM.

STUDDINGSAIL-YARDS. See YARDS.

To SURGE. To let a cable, or rope, round a capſtern ſlide up it, by gently ſlacking the part held on.

To SWAY. To haul down upon a rope or cable.

SWIFTERS. The after ſhrouds on each ſide of the main and fore maſts: they are above all the other ſhrouds, and are uſed as an additional ſecurity to the maſts. SWIFTER is alſo a ſmall rope uſed to confine the bars of a capſtern in their holes, while the men are heaving it about; and likewiſe a large rope, ſometimes uſed lengthways round a boat under the gunwale, to ſtrengthen it, and defend it from other boats which may ſtrike againſt it.

SWIFTERING OF SHROUDS. Stretching of them by tackles, to prevent any future extenſion.

SWIGGING OFF. Pulling upon the middle of a tight rope that is made faſt at both ends.

TACKS. Ropes uſed to confine the foremoſt lower corners of courſes, and of ſtayſails, and other fore and aft ſails; alſo the rope employed to haul out the lower corners of ſtuddingſails. TACK is alſo applied to that part of a ſail to which the tack is faſtened.

TACK OF A FLAG. A line ſpliced into the eye at the bottom of the tabling, for ſecuring the flag to the haliard.

TACK-STOPPER. See STOPPER.

TACKLE. A machine formed by the connection of a rope or fall, with an aſſemblage of blocks. The number of parts of the fall is more or leſs, in proportion to the effects intended to be produced. That part of the fall which is faſtened to one of the blocks, is called the STANDING-PART, and the other parts of it are called the RUNNING-PART.

Tackles are uſed to raiſe, or remove, weighty bodies; to ſupport the maſts, extend the rigging, or expand the ſails. They are either moveable, as connecting with a runner, or have one part fixed to an immoveable ſtation, by a hook, laſhing, &c.

A tackle is a convenient kind of purchaſe, but ſubject to much friction. Its power will be, the friction not conſidered, as the number of parts of the fall that are applied to ſuſtain the weight. If a

tackle conſiſts of a double and a ſingle block, and the weight to be hoiſted is hung to the double block, there will be four parts of the fall; and the weight reſting upon four ropes, equally ſtretched, each muſt bear the ſame part of the weight. Thus, ſuppoſe the weight hung to the double block be four hundred, then one hundred applied to the hauling part of the fall will ſuſpend it; and if as much more power be applied as will overcome the friction, it will purchaſe the weight: but, had the weight been hooked to the ſingle block, it would have reſted on three ropes only, each of which would bear a third of the weight; therefore a third of the weight being applied to the hoiſting part of the fall, would ſuſpend the weight, when hooked to the ſingle block; and as much more power being applied as will overcome the friction, would purchaſe the weight.

Ropes, if tight laid, will not eaſily bend round ſmall ſheaves, but will take up a conſiderable part of the power to force them into their proper direction; hence it follows, that blocks with ſmall pins, large ſheaves, and ſlack-laid ropes, are the beſt materials to obviate friction, and make tackles with.

The blocks that are fixed, are only for the convenience of turning the direction of the fall, they add nothing to the power of the purchaſe, but, on the contrary, deſtroy ſo much as is neceſſary to overcome their friction, and are therefore to be avoided as much as poſſible.

The ANCHOR-STOCK TACKLE is compoſed of a double block, and a ſingle block, ſtrapped, with a hook and thimble. BOOM TACKLES are compoſed of double and ſingle blocks, ſtrapped, with tails, and are uſed in getting the ſtudding-ſail-booms in or out. BOWLINE TACKLE is compoſed of a long tackle, and a ſingle block, ſtrapped, with a hook and thimble: it is uſed to bowſe up the main-bowline, when the ſhip is upon a wind. BURTON TACKLES are compoſed of double and ſingle blocks, and are uſed with pendents, to ſet up the ſhrouds, ſupport the topſail-yards, &c. A FISH TACKLE is compoſed of a long tackle, and a ſingle block, ſtrapped, with eyes, and is uſed with a pendent, to fiſh the anchor, and get it into its place. GARNET TACKLE is compoſed of a double block, and a ſingle block, ſtrapped, with a hook and thimble: it is hooked to the ſkiatick-ſtay in merchant ſhips, and is uſed to hoiſt goods in or out. JIGGER TACKLES are compoſed of double and ſingle blocks, ſtrapped, with tails, and are uſed for topping the main and fore yards by the lifts, &c. LUFF TACKLES are compoſed of double and ſingle blocks, ſtrapped, with a hook and thimble, and are uſed occaſionally at any of the ſhip. OUTHALLER TACKLE is compoſed of two ſingle blocks, ſtrapped, with tails, and is uſed to bowſe out the jib-boom. PORT TACKLES are uſed to hoiſt and lower the port-lids. QUARTER TACKLES are compoſed of double and ſingle blocks, ſtrapped, with eyes, and the lower blocks with a hook and thimble: they are uſed to hoiſt up water, and proviſions. REEF TACKLES are compoſed of two double, or two ſingle, blocks; one block is ſpliced into a pendent, and the other is ſtrapped, with an eye: they are uſed to draw the extremities of the reefs cloſe up to the yard-arms, for reefing the ſail. RELIEVING TACKLES are luff tackles, uſed to the fore-end of the tiller, when the tiller ropes are damaged. RIDGE TACKLE is compoſed of a double block, and a ſingle block, ſtrapped, with an eye: it is uſed to ſuſpend the awning in the middle. ROLLING TACKLES are luff tackles, uſed to the topſail-yards, to ſupport them, and preſerve the parrals. RUDDER TACKLES are compoſed of long tackle blocks, and ſingle blocks, ſtrapped, with hooks and thimbles: they are uſed to ſave, or direct the rudder, when any accident happens to the tiller. RUNNER TACKLES are compoſed of double and ſingle blocks, and a pendent; the lower blocks are ſtrapped, with a hook and thimble: they are uſed to ſet up the ſhrouds, and to get the maſt-heads forward, for ſtaying the maſts. STAY TACKLES, MAIN AND FORE, are compoſed of double and ſingle blocks, ſtrapped, with hooks and thimbles, except the blocks ſpliced into a pendent: they are uſed for getting the pro-

viſions, &c. out of the fore and main hold, and for getting the boats in or out. The pendent, formerly, travelled on the ſtay, by iron thimbles; but this is now diſcontinued in the Royal Navy, as they much injured the ſtay, by the friction. Staysail Stay Tackles are compoſed of double and ſingle blocks; the lower blocks are ſtrapped, with a hook and thimble; they are uſed to ſet up the jib, and other ſtayſail-ſtays. Shifting Backstay Tackles are compoſed of double and ſingle blocks, ſtrapped, with a hook and thimble, and are uſed to ſet up the ſhifting backſtays, where wanted. Topmast Stay, and Preventer Stay, Tackles are compoſed of long tackle blocks, and ſingle blocks; the lower blocks are ſtrapped, with a hook and thimble; they are uſed to ſet up the topmaſt, and preventer ſtays. Fore Topgallant Stay Tackle is compoſed of a double and a ſingle block, and is uſed to ſet up the fore topgallant ſtay. Tack Tackle is compoſed of a double and a ſingle block, ſtrapped, with hooks and thimbles; and is uſed for bowſing down the tack of fore and aft mainſails. The Top Tackle is compoſed of double or treble blocks: it is attached to the top-rope-pendent, and uſed to erect the topmaſts, at the heads of the lower maſts. Truss Tackles are compoſed of two double blocks, ſtrapped, with hooks and thimbles, and are uſed to ſecure the lower yards to their maſts, being hooked to the truſs-pendent. Winding Tackle is compoſed of a four-fold and a treble block, or a treble and a double block, ſtrapped, with eyes: it is attached to the winding-tackle-pendent, and is chiefly uſed to get in and out the guns. Yard Tackles are compoſed of double and ſingle blocks; the double blocks are ſpliced into the lower ends of pendents, and the ſingle blocks are ſtrapped, with hooks and thimbles: they are uſed to hoiſt the boats in or out.

TACKLE-FALL. That end of the rope of a tackle which is bowſed on, or the rope which compoſes the tackle.

TACKLE-PENDENTS. See Pendents.

TAIL. The long end of a block-ſtrap, by which the block is attached to any place required.

TARPAWLING. Canvas paid over with tar, and uſed to cover the hatches, to prevent water from coming in; and to cover the blocks at the ſheer-heads of hulks, &c.

THIMBLES. A kind of iron rings, whoſe outſides are grooved, to receive ropes of different ſizes. They are fixed to the rigging for blocks to be hooked to, and for ropes to reeve through, &c.

THROAT. The inner end of a gaff, or boom.

TILLAR-ROPE. See Rope.

THRUMMING. Interplacing ſhort pieces of thrumbs, or rope-yarn, in a regular manner, into matting, through intervals made by a fid.

TIMENOGUY. A Rope faſtened at one end to the fore-ſhrouds, and nailed at the other end to the anchor-ſtock, on the bow, to prevent the fore-ſheet from entangling.

TONGUE. A ſhort piece of rope ſpliced into the upper part of ſtanding-backſtays, &c. to the ſize of the topmaſt-heads: it is ſerved over with ſpun-yarn, and is uſed to keep them open to the ſize of the maſt-heads.

TOP. A platform, ſurrounding the lower maſt-heads, to extend the topmaſt-ſhrouds, &c.

TOP-ROPE. See Rope.

TOP-ROPE-PENDENTS. See Pendents.

TOP-TACKLE. See Tackle.

TOPMAST-STAY-TACKLE. See Tackle.

TOPPING. The act of drawing one of the yard-arms higher than the other, by ſlackening one lift, and pulling upon the other.

TOPPING-LIFT. A tackle to ſuſpend, or TOP, the outer end of a gaff, boom, &c.

TOPSAIL-YARDS. See YARDS.

TOPGALLANT-YARDS. See YARDS.

TOP-NETTING. See NETTING.

TRACING-LINE. See LINE.

TRAVELLER. A large iron thimble, whoſe diameter is larger than the common thimbles, though the ſurface is ſmaller. Travellers are uſed to facilitate the deſcent of topgallant-yards by the back-ſtays, the travellers being placed on the back-ſtays, and ſurrounded by a ſhort rope, or tail, which is faſtened round the yard-arms. The JIB-TRAVELLER is a circular iron hoop, with a hook and ſhackle, uſed to haul out the tack of the jib.

TRAVERSE-HORSES. See HORSES.

TREE NAILS. Cylindrical wooden pins, uſed by riggers for levers, or heavers; alſo the wooden pins by which the ſhip's planks are faſtened to the timbers.

TRESTLE-TREES. Two ſtrong bars of oak, bolted to the 'thwartſhip ſides of the lower maſt heads, to ſupport the top, and weight of the topmaſt; and to the topmaſt heads, to ſupport the topgallant-maſts, &c.

TRUCKS. Small pieces of wood, of various ſhapes, uſed for different purpoſes. FLAG-STAFF-TRUCKS are round flat pieces of elm, with a ſmall ſheave on each ſide. They are fixed, by a ſquare mortiſe-hole made in the middle, upon the upper end of flag-ſtaffs, and are uſed to reeve the haliards. PARRAL-TRUCKS are round balls of elm, or other wood, and have a hole through the middle, in which a rope is reeved, to form the parrals. SEIZING-TRUCKS are ſimilar to parral-trucks, but have a ſcore round the middle to admit a ſeizing. They are uſed to lead ropes through. SHROUD-TRUCKS are ſhort cylindrical pieces of elm, &c. they have a hole through the middle, lengthways, a groove down the ſide, of the ſize of the ſhrouds, and a ſcore round the middle to admit a ſeizing. They are ſeized to the ſhrouds, to lead ropes through, that they may be more readily found.

TRUSS. A rope employed to confine or ſlacken the lower-yards to or from their reſpective maſts.

TRUSS-TACKLE. See TACKLE.

TRUSS-PENDENTS. See PENDENTS.

TYE. A ſort of runner, or large rope, uſed to convey the effort of the tackle to hoiſt the upper yards and gaff.

VANGS. The braces that keep ſteady the peek of gaff ſails and fore-and-aft ſails.

VANG-PENDENT. See PENDENTS.

To VEER AWAY. To let go a rope gently.

WARP. A hawſer, uſed to remove a ſhip from one place to another.

WARP, or more properly WOOF, is the twine or thread woven acroſs the knittles in pointing.

WARP OF SHROUDS. The firſt given length, taken from the bolſter at the maſt-head to the foremoſt dead-eye.

WHIP. A ſmall ſingle tackle, formed by connecting the fall to a ſingle block, or with two blocks, the one fixed, and the other moveable: it is uſed to hoiſt light bodies out of the hold, &c.

To WHIP. To turn a piece of pack-thread, &c. upon the end of a rope, to prevent its unravelling.

WHIP UPON WHIP. The greateſt purchaſe that can be gained by blocks, which is formed by fixing the end of one whip upon another whip fall. Thus two ſingle block will afford the ſame purchaſe as a tackle, having a double and a ſingle block, and with much leſs friction. This purchaſe ſhould therefore be uſed whenever the length of the hoiſt will admit of it. To topſail, and topgallant-yards, that hoiſt with a ſingle tye, there is ſufficient room to apply this purchaſe as haliards, which will overhaul with great facility.

WINDING TACKLE. See TACKLE.

WINDING TACKLE-PENDENT. See PENDENT.

WINDLASS. A machine, uſed in moſt merchant ſhips, to anſwer the purpoſe of a capſtern. A SPANISH WINDLASS is formed of an iron bolt, placed in a hole, which is hove round by a woolder that acts as a lever for turning it round. It is uſed to ſtretch ſmall rigging for ſerving, &c. &c.

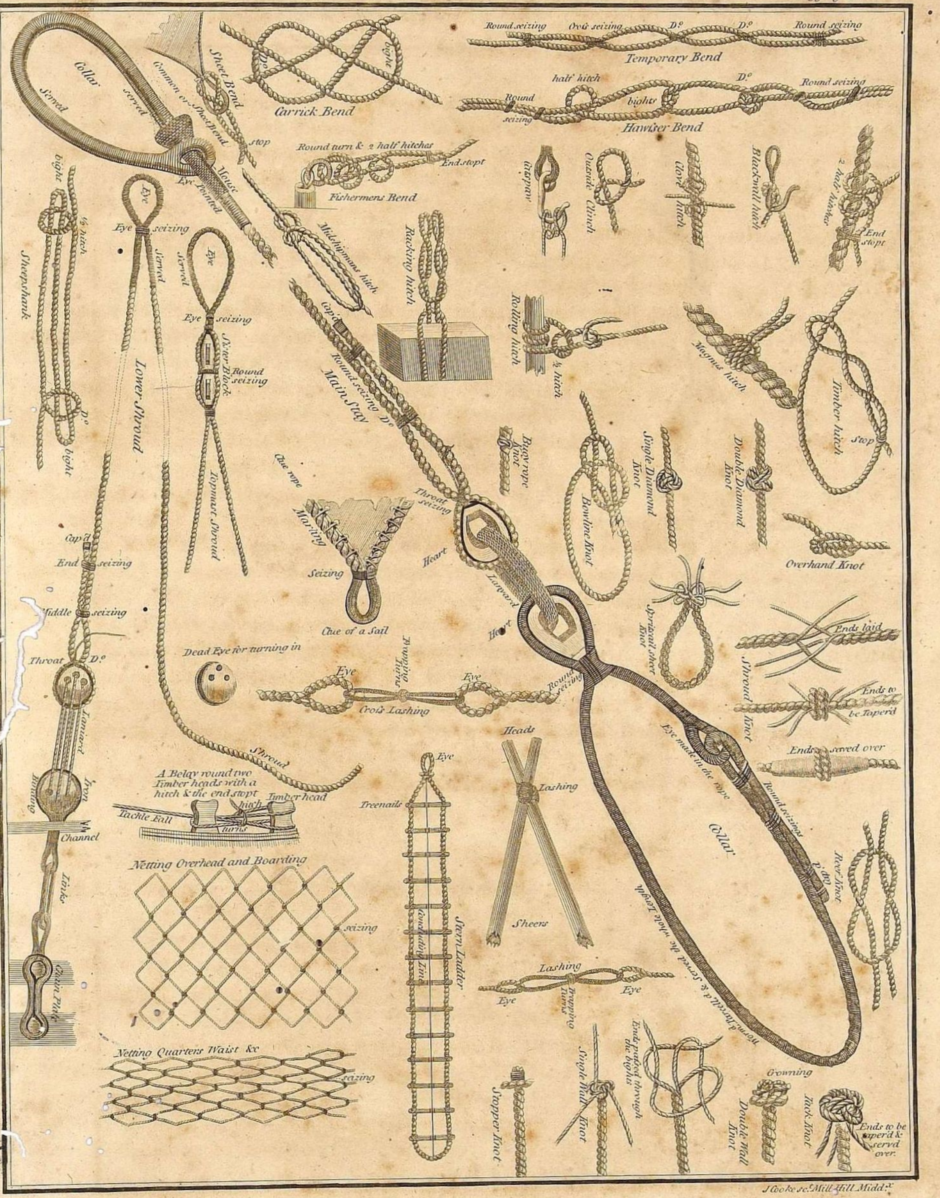
WOOLDING. Winding ſeveral cloſe turns of rope in a tight manner round maſts and yards, that are made of ſeveral united pieces, to ſtrengthen and confine the ſame together.

WORMING. Winding a rope cloſe along the cuntlines, to ſtrengthen it, and make a fair ſurface for ſervice.

YARDS. Long cylindrical pieces of fir timber hung upon the maſts of ſhips, to expand the ſails to the wind. The lower yards to which the courſes are bent, are the largeſt; ſuch are the main, fore, and mizen yards which, except the mizen, hang to the maſts at right angles with the ſhip's length. The MIZEN-YARD, hangs obliquely to the mizen-maſt, parallel to the ſhip's length. The TOPSAIL-YARDS which expand the topſails, hang to the topmaſts, next above the lower yards. The TOPGALLANT-YARDS, which expand the topgallant-ſails, hang above them; and the ROYAL-YARDS, which expand the royal-ſails are hung above the topgallant-yards. The CROSS-JACK-YARD is uſed to expand the foot of the mizen topſail; and the topſail, or ſquare-ſail, of veſſels with one maſt. The DRIVER-YARD is a ſmall yard, which expands the head of the driver without the peek of the gaff, to which it is hoiſted by haliards. STUDDING-SAIL-YARDS, hang to the extremities of the yards, and by theſe are expanded the heads of the ſtudding-ſails.

YARD-TACKLE. See TACKLE.

YARD-HORSES. See HORSES.



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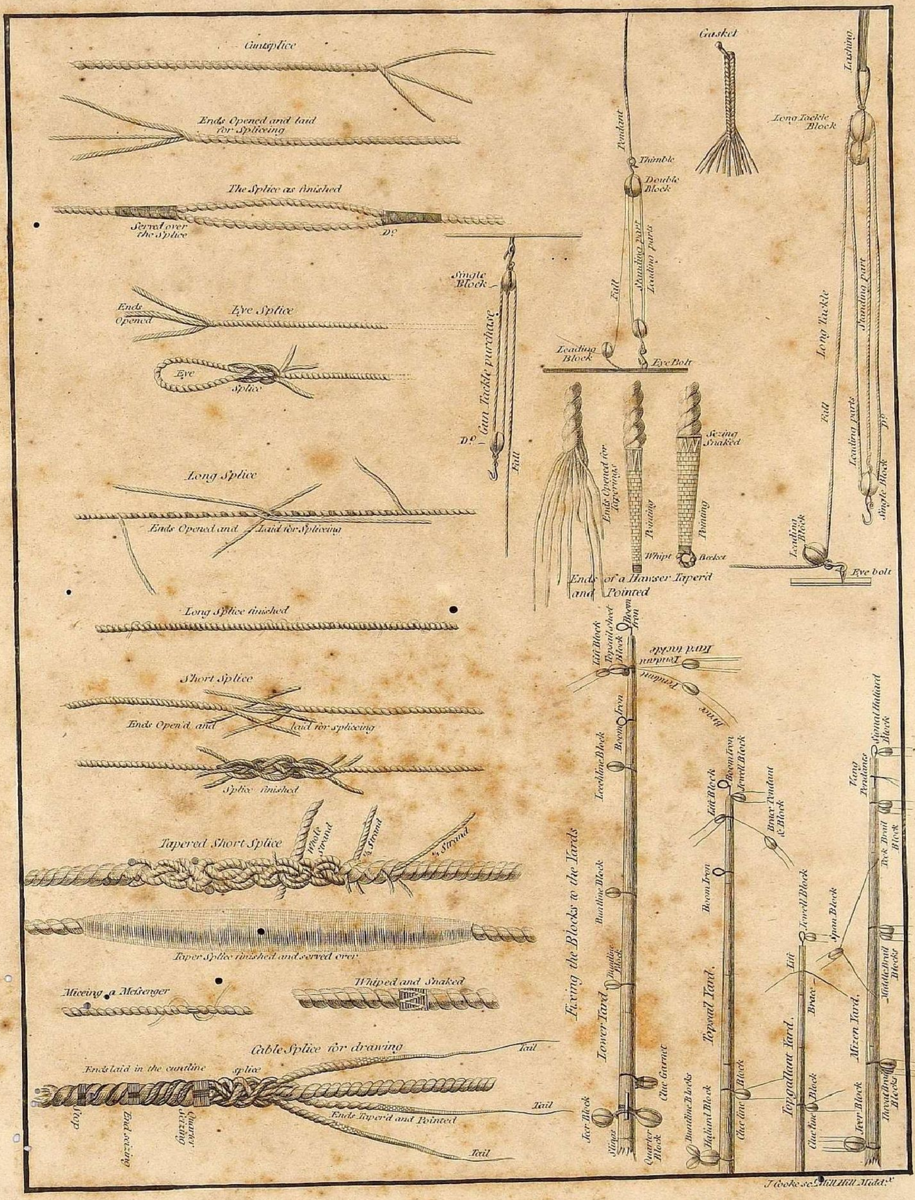

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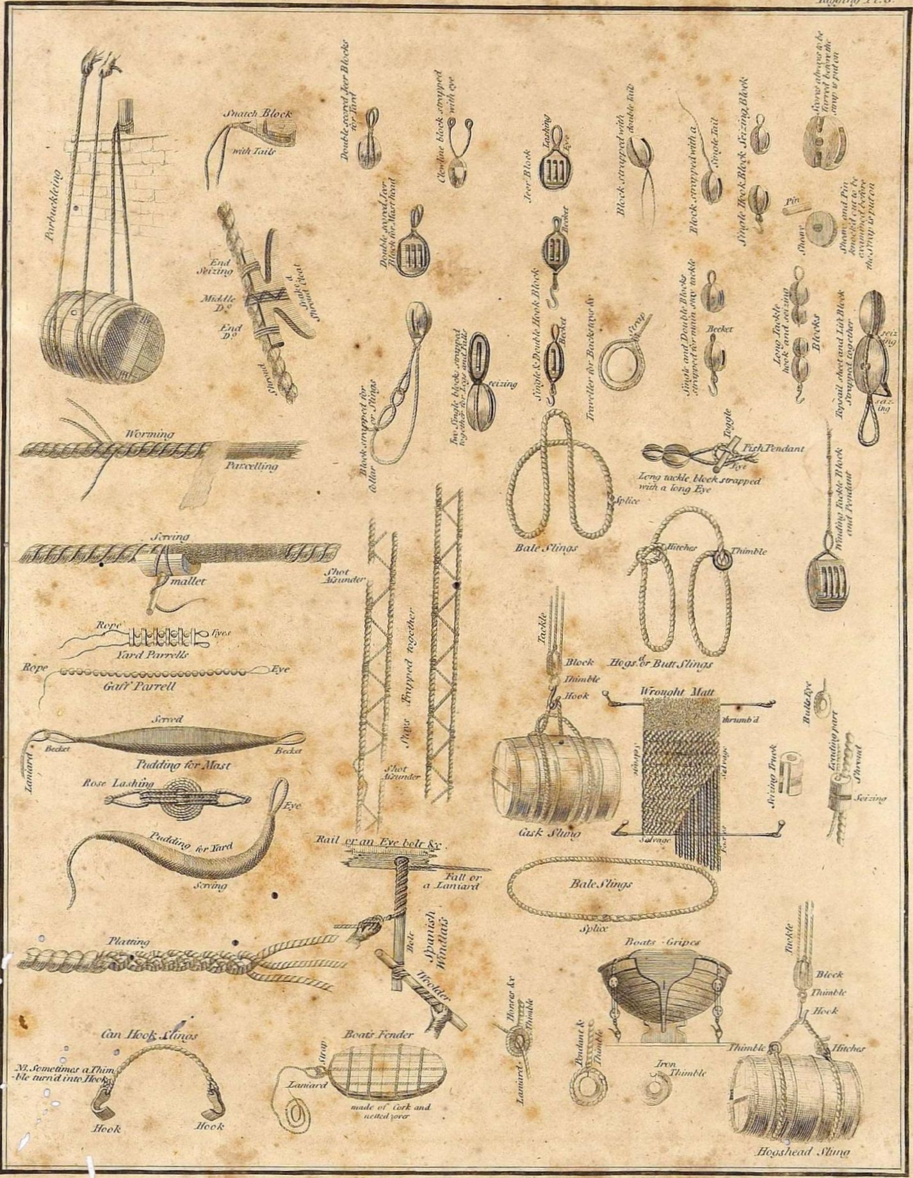

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THE PRACTICE OF RIGGING.

RIGGING is, in part, prepared on ſhore, in a rigging-houſe, which has the following conveniences, &c. viz. At the upper end is a windlaſs; and, at certain diſtances, down the middle are two rows of large ſtrong poſts, for ſtretching ropes, and laying on ſervice. On each ſide of the houſe are births for the men to prepare ſmall rigging in.

The ropes for the ſeveral parts of rigging are, in circumference and in length, according to the Table of Dimentions, for ſhips of each rate, given in this work.

There is much ſubordinate knowledge neceſſary before a perſon can either prepare rigging in the houſe, or fit it on board of the ſhip. This conſiſts of knotting, ſplicing, making of hitches, mouſing, ſerving, &c. the neceſſary inſtructions for which are accordingly here given.

INSTRUCTIONS FOR KNOTTING, SPLICING, MAKING OF HITCHES, MOUSING, SERVING, &c.

BENDS. Common Bend. Paſs the end of a rope through the bight of another rope, then round and underneath the ſtanding part; but, to prevent its jambing, paſs it round again under the ſtanding part. The ſheet of a ſail has the end paſſed up through the clue, then round the clue, and underneath the ſtanding part. The rope of a buoy is paſſed as a ſheet, and has the end ſtopt. Bends of a cable-clinch are paſſed as a ſeizing. Carrick Bend. Lay the end of a rope, or hawſer, acroſs its ſtanding part; then take the end of another rope, or hawſer, and lay it under the firſt ſtanding part, at the croſs, and over the end; then through the bight, under the ſtanding part; then over its own ſtanding part, and underneath the bight again: it is often uſed in haſte, to form a greater length, to warp or tow with. Fisherman's Bend. Take a round turn with the end of a rope, or hawſer, through the ring of an anchor, &c. and a half hitch through both parts, and another half hitch round the ſtanding part; then ſtop the end. Hawser Bend is a hitch, with a throat and end ſeizing made on one end, and the end of another hawſer reeved through the bight, and hitched with a throat and end ſeizing. Temporary Bend, commonly made to reeve through large blocks, thus: Lay three fathoms of the end of two hawſers together, and put on a round ſeizing in the middle; then reverſe the ends to each ſtanding part, and put on a throat ſeizing between each end and the middle, and a round ſeizing on each end.

CATSPAW, for hooking up ſhrouds, &c. Lay the end of a rope, or fall, over the ſtanding part and middle of the bight, then turn it three times over both parts, and hook the tackle through both bights.

CLINCHES. Inside Clinch. The end of a cable is paſſed through the hawſe hole, and reeved through the ring of the anchor; then paſſed round the ſtanding part, through the bight, and a circle, which is called the clinch, formed the ſame ſize as the ring of the anchor: a throat and end-bend is then clapped on oppoſite each other, and a ſeizing of ſpun-yarn cloſe to the end. All other

inſide clinches are ſtopped, ſimilar to the bends of this clinch, with ſmall rope, or ſpun-yarn. OUTSIDE CLINCH only differs from an inſide clinch, by paſſing the end on the outſide, and not through the bight, for the more readily caſting it off.

CROWNING, OR FINISHING A WALL-KNOT. Lay the firſt ſtrand over the walling, and the ſecond ſtrand acroſs over the firſt, and the third ſtrand acroſs over the ſecond, and through the bight of the firſt; then haul the ends tight.

FLEMISH EYE, OR MADE EYE. Open the end of a rope; then open the yarns, dividing them into two parts, and laying one part over the other; or place them together, one part in the other: then well marl, parcel, and ſerve them together.

FOXES are two or three rope-yarns of junk, twiſted together on the thigh till quite hard; then well rubbed with a hand-full of rope yarn. Make ſeveral bights over your thumbs to twiſt them together.

FRAPPING is taking ſeveral turns with the end of a laſhing round the middle of it, or any number of ropes, and drawing the ſeveral parts tight together.

GASKETS are made with three-yarn foxes. Thoſe for large ſhips conſiſt of nine foxes, and thoſe for ſmaller of ſeven. Place four foxes together, but lay them of unequal lengths; mark the middle of the whole length, and plait four foxes together, for eight or nine inches; then double it and plait the eight parts together for five inches, and work in the odd fox. The whole is then plaited together for eighteen inches in length; then leave out one fox, and ſo keep leſſening, one fox at a time, till you come to five. If the foxes work out too faſt, others muſt ſupply their places, till the whole length is worked, which is from five to ſeven fathoms long. To ſecure the ends, make a bight, by turning upwards one of the foxes, and plait the others through the bight, then haul tight upon that laid up.

HITCHES. CLOVE-HITCH is two half-hitches, one at the back of the other, made by the ratlings round the ſhrouds, and by buoy ropes round anchors. BLACKWALL-HITCH. Take the end of a rope, or fall of a tackle, round the back of a tackle-hook, and jamb it underneath the ſtanding part. HALF-HITCH. Paſs the end of a rope over the ſtanding part, and through the bight, and lay it up to the ſtanding part; and repeat it for two half hitches. MAGNUS-HITCH. Take two round turns through the ring of an anchor, &c. and bring the end over the ſtanding part, then round the ring and through the bight. MIDSHIPMAN'S-HITCH. Take a half hitch round the ſtanding part, and a round turn above the hitch, which jambs tight. It is moſtly uſed to make faſt the ſheets of ſailing boats. RACKING-HITCH, for ſhortening ſlings. Lay the bight over both parts, and turn it over ſeveral times; then hook the tackle through the bights. ROLLING-HITCH. Take two round turns round a maſt, &c. and make two half hitches on the ſtanding part. TIMBER-HITCH. Lay the end over the hauling part, and paſs it through the bight; then take ſeveral turns round the ſtanding part, and ſtop the end. The bight ſerves as a ſling for bales, drawing of timber, &c.

KNITTLES are two or three rope-yarns twiſted hard together between the finger and thumb, with the twiſt of the yarn beginning in the middle; the ends are whipped.

KNOTS. BOWLINE-KNOT. Hold the end of the rope in the right hand, and the ſtanding part in the left; then paſs the end under the ſtanding part in the left hand, and over through the bight; then bring it over the ſtanding part, and paſs it again through the bight, and haul tight. RUNNING-BOWLINE-KNOT has the knot made on the bight, inſtead of the ſtanding part, round which it makes a bight. BUOY-ROPE-KNOT. One end is unſtranded for one yard in length, ſtopped with rope yarn, and one of the nine ſmaller ſtrands taken out of each of the three larger ſtrands, which are then laid

together again. The three ſmaller ſtrands are double walled, right handed cloſe to the ſtop, and then laid up their cuntlines. DIAMOND-KNOT, ſingle. The ſtrands of the rope are untwiſted to where the knot is deſigned to be made; then form bights, by laying the ſtrands down the ſides of the rope, and keep them faſt: then paſs the end of the firſt ſtrand through the ſecond bight, miſſing the firſt; and the end of the ſecond ſtrand through the third bight, round the ſecond; and the end of the third ſtrand round the ſecond and third bight; then paſs the end through the firſt bight, and haul tight. The ſtrands are then twiſted together to the next knot. DIAMOND-KNOT, double, is made by the ſeveral ſtrands following their reſpective places through the bights of the ſingle knot; and led up through the middle, and the ſtrands twiſted together to the place of the next knot. Theſe knots are uſed as ornaments upon bell and ſide ropes. OVERHAND-KNOT is made by paſſing the end over the left hand, and through the bight. REEF-KNOT is to attach the two ends of a rope together; and, in making, obſerve to paſs both parts of the rope on one ſide, in the bight of the other, thus; turn up one end, and form a bight, and put the other end up through the bight; take it round underneath, and paſs it through the bight again. SHROUD-KNOT. The two ends are opened about four feet, and interplaced one in the other, as for ſplicing: then a ſingle wall knot is made with the ends on each part, and the ends laid in the cuntline, tapered, and ſerved over with ſpun-yarn. SPRITSAIL-SHEET-KNOT. The ends of the rope are firſt thruſt through holes, one on each ſide of the ſpritſail-ſheet block; then untwiſted about two feet, and the ſix ſtrands walled together, and crowned at top, thus: lay four ſtrands over the walling, two to the right, and two to the left; the remaining two ſtrands are woven contrarywiſe over and under the other ſtrands, and hauled tight. The block is then ſeized in the bight. STOPPER-KNOT is made the ſame way as a double wall knot, and the ends put up through the heart, and whipt at top. TACK-KNOT is made by untwiſting the ſtrands ſufficiently, and there making a ſtop with rope-yarn; then ſingle wall and crown, then double wall and double crown, and haul the ends tight, and jamb the knot: then the ſtrands are led down through the walling, and laid down in the cuntline; tapered, marled, and ſerved over with ſpun-yarn. WALL-KNOT, ſingle, is made by untwiſting the ends of a rope, and making a bight with the firſt ſtrand; then paſſing the ſecond over the end of the firſt, and the third ſtrand over the end of the ſecond, and through the bight of the firſt, and haul the ends tight. WALL-KNOT, double, is made by paſſing the ends, ſingly, cloſe underneath the firſt wall, and thruſting them upwards through the middle, only the laſt end comes up under two bights.

LASHING. LASHING OF BLOCKS. Take a number of turns, parallel to each other, through the eye of the block-ſtrap, and round any object, as a maſt, yard, &c. and, to ſtrengthen the laſhing, take ſeveral croſs turns with the end, and make faſt.

MARLING is winding any line round a rope, and ſecuring every turn by a hitch, ſo that they may be independent of each other, and remain fixed, ſhould either be cut through by friction. It is principally uſed to fix on the clues of ſails, and top-brims of topſails. Splices are marled down for ſerving with rope-yarn or twine.

PARCELLING, long narrow ſlips of worn canvas, laid ſmooth round a rope in ſpiral turns, and well tarred. It is previouſly done when a rope is to be ſerved, or a mouſe formed upon ſtays.

PLAITING, braided cordage, made by rope-yarns, &c. twiſted together, and then laid one over the other alternately; or the end of a rope opened, and the ſtrands placed together in the ſame manner.

POINTING is tapering the end of a rope, or ſplice, and working, over the reduced part, a ſmall cloſe netting, with an even number of knittles twiſted from the ſame, to prevent the end untwiſting,

and to make it go more eaſily through a block, or hole. Half the knittles are firſt laid down, leaving out every other one, then three turns of the warp is taken round them; then take up thoſe knittles, and lay down the other half, and take three turns of the warp round them, and ſo on, alternately, until the length be once and a half the circumference of the rope. The end and upper part of the knittles are then round-ſeized, and ſnaked with twine, &c.

POINTS, ſhort pieces of braided cordage, plaited together as gaſkets are; beginning in the middle with nine foxes, and tapering to five at the ends, and from one fathom and a half to one fathom in length. They are uſed to reef the courſes and topſails.

ROPEBANDS differ from gaſkets only in their length, being from ſeven to nine feet long.

SEIZING is joining together two ropes, or different parts of one, with ſmall rope, line, or ſpun-yarn, by taking ſeveral cloſe turns round them, from ſix to ten, according to the ſize of the rope: they are ſtrained tight. The lower turns have always one more than the riding or upper turns; two turns are taken acroſs the ſeizing, between the two ropes ſeized; the end is taken under the laſt turn; hove tight; and knotted, cloſe to the jambing turn, if large, with a wall knot crowned, and if ſmall, with an over-hand knot, and cut off. Seizings to the double ſtraps of blocks are croſſed each way with two turns.

A SELVAGEE is ſeveral rope-yarns placed together, and marled together with ſpun-yarn, in the form of ſlings. It is uſed to attach the hook of a tackle to any rope, ſhroud, or ſtay, to extend them, by taking two or more turns round the ſame, and hooking in the bights.

SENNIT is braided cordage, made by plaiting from five to thirteen rope-yarns together, one over the other, according to the ſize and length, always keeping an odd yarn.

SERVING is encircling a rope with line or ſpun-yarn, &c. to keep it from rubbing and chafing. The end of the ſpun-yarn, for ſervice, is placed under the two or three firſt turns, to keep it faſt; then two turns are taken round the rope and mallet, on each ſide of and round the handle. The mallet is then gradually turned round the rope by its handle, while another perſon paſſes the ball of ſpun-yarn; and this is continued until the rope is covered the length required. When the mallet is within a few turns of the end, take the turns off the mallet, and paſs them by hand, and heave the end well through, where it is made faſt, as at firſt.

SHEEP-SHANK is made to ſhorten backſtays, &c. by bending part of the backſtay, &c. in three parts, and taking a half hitch over the bights.

SNAKING. A ſort of faſtening to confine the outer turns of ſeizings, &c. with the ſame ſize rope, line, ſpun-yarn, &c. by paſſing it acroſs, and under the outer turns, at angles.

SPLICING. THE CUNT-SPLICE forms an eye in the middle of a rope, &c. as the eye-ſplice doth at the end, by interweaving the ends into the ſtrands of the rope, &c. at certain diſtances from each other, ſo that the rope becomes double, in the extent of the ſplice. This ſplice is uſed for pendents, or any thing that goes over the maſt-head with a ſplice; alſo for lead-lines, log-lines, and fiſhing-lines, where the ſhort ſplice would be liable to ſeparate. EYE-SPLICE forms an eye, or circle, at the end of a rope, on itſelf, or round a block, &c. The ſtrands are untwiſted, and the ends puſhed through intervals made in the ſtrands, by a fid or marline-ſpike, at that diſtance on the rope which the eye may require; obſerving to put the middle end through firſt, then paſs it over the ſurface of the ſecond ſtrand, and puſh it through the third; repeat the ſame with the two other ends, laying them fair aſunder. The ends of this ſplice are tapered, by gradually reducing the yarns, then placed ſmooth along the rope; then marled, and ſerved with ſpun-yarn, round all blocks in the royal navy. LONG SPLICE is made to rejoin a rope or ropes, intended to reeve in a block, without

encreasing its size. The ends are opened from one half to a whole fathom in length, and placed close together regularly one in the other; one strand is then unlaid, and the opposite strand laid up its intervals each way, and the two strands knotted together at the ends and middle of the splice; the ends are then halved, and pushed under the next strand. SHORT SPLICE is made by untwisting the ends of two ropes, or the two ends of one rope, and placing the strands of one opposite to and between the strands of the other: draw them close together, and push the strands of one under the strands of the other, the same as the eye-splice. This splice is used for block-straps, slings, &c. and the ends are tapered and served. TAPERED SPLICE, mostly used on cables, is made by unlaying a certain length of each cable, then placing them together, and interplacing the strands, as in the short splice, twice each way, and hauled tight each time; then inlay the strands, or ends, successively, and reduce them, by cutting away one strand; then interplace the two remaining strands, and reduce them to a single strand, which is again thrust through, and cut off. The splice is then served over with spun-yarn, something more than the whole length. DRAWING SPLICE, used on cables, is made by unlaying about three fathoms of the ends; then place them together, and make a short splice: then leave about one fathom, and from thence reduce each strand to a long taper, by gradually cutting away as many yarns as necessary, and neatly point over the taper; then lay the ends up the cuntlines, and clap on a quarter seizing at each end of the splice, an end seizing at the beginning of the pointing, and a stop at the ends of the tails. This is the best splice for cables, as it may be readily taken asunder. Another good method of making a CABLE SPLICE, is to put the ends in twice each way; then to pick out the strands, worm part of them round the cable, and taper away the rest, which should be marled close down; then clap on a good throat and two end seizings of ratline.

STOP is a temporary seizing, and performed similarly. When used to stop worming, it is snaked.

WHIPPING, to prevent the unravelling of the end of a rope. Take several turns of spun-yarn, &c. round the end of the rope, and lay one end under the four first turns, and the other end under the four last turns, and haul tight. Another method is, to knot every turn on the contrary side of the rope, hauling it tight, and finishing the last turn with a reef-knot.

WORMING. Wind a small rope in the cuntlines of the strands of cables, shrouds, or stays; and spun-yarn in those of ropes four inches in circumference and above. The first end of the worming is securely stopped; it then fills one interval, or cuntline; and, when arrived at the end of the length intended to be served, it is there stopped; then laid back into the second interval; and so on successively, stopping it at the ends.

When worming is wanted to be cut without waste, observe this general rule. Once the length of the service, multiplied by the number of strands, or intervals, and one-third more added, gives the length of the worming. EXAMPLE. Twelve fathoms of service, in a four-strand-rope, will take 64 fathoms of rope for worming; and for a three-strand-rope, 48 fathoms.

IN the courſe of the directions for the preparation of rigging in the houſe, the firſt of the following tables will be often referred to, and the two others are neceſſary to be known.

A TABLE

SHEWING THE LENGTH OF THE FIRST WARP OF STANDING RIGGING.

GUNS		FORE.					MAIN.					MIZEN.				
		Shrouds.	TOPMAST		TOPGALLANT		Shrouds.	TOPMAST		TOPGALLANT		Shrouds.	TOPMAST		TOPGALLANT	
			Shrouds.	Back-ſtays.	Shrouds.	Back-ſtays.		Shrouds.	Back-ſtays.	Shrouds.	Back-ſtays.		Shrouds.	Back-ſtays.	Shrouds.	Back-ſtays.
		Ft. In.	Ft. In.	Ft. In	Ft. In.	Ft. In	Ft. In.	Ft. In.	Ft. In	Ft. In.	Ft. In	Ft. In.	Ft. In.	Ft. In	Ft. In.	Ft. In
100	with 3 Decks.	62. 0	55. 6	116. 0	82. 0	140. 0	71. 0	60. 0	128. 0	88. 6	150. 0	55. 0	43. 0	95. 0	63. 0	114. 0
98		61. 0	52. 0	109. 0	76. 0	132. 0	68. 6	58. 0	122. 0	85. 9	148. 9	51. 0	41. 6	88. 0	59. 0	106. 0
80		55. 0	50. 6	105. 6	73. 10	126. 0	62. 0	56. 6	114. 0	82. 6	139. 0	48. 0	40. 0	82. 0	57. 0	105. 0
80	with 2 Decks.	66. 0	60. 0	123. 0	86. 0	150. 0	69. 0	65. 0	132. 0	95. 6	160. 6	59. 6	42. 0	96. 0	60. 0	117. 0
74		65. 0	55. 6	118. 0	80. 0	143. 0	74. 0	59. 0	129. 0	87. 0	158. 0	60. 0	42: 0	97. 6	60. 0	117. 0
64		55. 0	47. 0	101. 0	70. 0	127. 0	61. 0	52. 0	113. 0	76. 0	137. 0	50. 0	38. 0	85. 6	54. 0	99. 0
50		50. 0	44. 6	93. 0	64. 0	114. 0	57: 0	48. 0	102. 0	73. 0	126. 0	45. 0	36. 0	78. 0	48. 0	93. 0
44		46. 0	41. 0	89. 0	60. 0	108. 0	54. 0	46. 6	100. 0	69. 0	123. 0	43. 0	36. 0	78. 0	48. 0	87. 0
38	with 1 Deck.	54. 0	40. 6	92. 0	62. 0	109. 0	58. 0	46. 3	102. 3	68. 0	123. 0	50. 0	36. 0	78. 3	47. 6	95. 0
36		53. 0	42. 0	93. 0	62. 0	110. 0	60. 0	49. 6	102. 0	72. 0	126. 0	47. 0	37. 6	79. 6	55. 0	96. 0
32		48. 0	39. 0	85. 6	58. 0	104. 0	55. 0	45. 0	96. 9	66. 0	118. 0	46. 6	34. 6	75. 0	47. 6	93. 0
28		45. 6	38. 0	82. 6	56. 0	100. 0	52. 9	43. 0	92. 0	63. 0	112. 0	44. 6	32. 0	72. 0	45. 0	90. 0
24		42. 0	36. 0	78. 0	53. 0	96. 0	47. 0	39. 6	86. 0	60. 0	105. 0	43. 0	30. 0	69. 0	42. 0	87. 0
20		40. 0	35. 0	75. 0	51. 0	89. 0	45. 0	38. 6	81. 0	57. 0	98. 0	40. 0	27. 0	66. 0	39. 0	8[illegible]. 0
Sl.		38. 0	30. 0	66. 0	44. 0	80. 0	42. 0	33. 6	72. 0	49. 0	87. 6	35. 6	24. 0	57. 0	=	=
Brig		31. 6	26. 6	56. 6	42. 0	72. 0	37. 6	29. 6	66. 0	45. 0	84. 0	=	=	=	=	=

THE FOLLOWING ARTICLES AND THEIR SPECIFIC QUANTITIES ARE ALLOWED FOR PREPARING THE RIGGING IN THE HOUSE.

Names of the Articles.	110 & 100 Guns.	98 & 90 Guns.	80 Guns	74 Guns	64 Guns	50 & 44 Guns.	38 Guns	36 Guns	32 Guns	28 Guns	24 Guns	22 & 20 Guns.	16 & 14 Guns.	Brig.
Spunyarn. — Cwt. —	86	84	80	82	80	70	70	70	68	64	58	52	45* / 40*	18
Tarred Lines. — No. —	36	36	36	36	36	30	30	30	26	24	23	22	20	10
Tarred Marline. lb. —	65	65	65	65	65	50	50	50	48	42	39	36	32	26
Worn Canvas. Yds. — —	650	600	600	600	600	500	515	500	480	440	395	350	300	180
Tar. Barrels. — —	3½	3½	3½	3½	3½	2	2	2	2	2	2	2	1½	1
Tallow. lb. — —	88	86	84	84	82	70	70	70	66	62	59	56	50	30
Woolding Nails. — No. —	1000	1000	900	1000	850	700	700	700	650	640	620	600	500	=
Old Leather Buckets. – No. —	4	4	4	4	4	3	3	3	3	3	3	3	2	=
Ordinary Twine. — lb. —	4	4	4	4	4	3	3	3	3	2½	2	2	2	2
Mousing for Main, Fore, Mizen, and Preventer Stays. Log Lines. No. —	18	18	18	18	18	15	15	15	14	14	14	14	13	10
Mousing for Main, Fore, Mizen, and Preventer Stays. Rope 1 Inch	216 Fm.	216	216	216	210	180	180	180	175	170	168	166	160	=
Mousing for Main, Fore, Mizen, and Preventer Stays. Rope ¾ Inch	150 Fm.	150	150	150	145	130	130	130	125	120	118	116	110	100

* If 6 pair of fore and main shrouds, 45 cwt. is allowed; if but 5 pair, only 40 cwt.

CONTRACT PRICES PAID BY GOVERNMENT (FOR LABOUR ONLY) FOR RIGGING SHIPS IN THE RIVER THAMES, IN SUMMER AND WINTER.

WINTER BEING FROM THE 15th OF NOVEMBER TO THE 15th OF MARCH.

	110 & 100 Guns.	98 & 90 Guns.	80 Guns.	74 Guns.	64 Guns.	50 Guns.	44 Guns.	36 & 38 Guns.	32 Guns.	28 Guns.	24 Guns.	22 & 20 Guns.	16 & 14 Guns.	Brigs.
	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.	£.	£. s. d.
Summer. —	116	106	106	106	86	70	60	60	50	50	40	40	35	23 6 8.
Winter. —	122	112	112	112	92	76	66	66	56	56	46	46	40	26 13 4.
Allowed Time to complete	Days 15	Days 14	Days 14	Days 14	Days 14	Days 14	Days 12	Days 12	Days 12	Days 12	Days 12	Days 12	Days 10	Days 6

RIGGING PREPARED IN THE HOUSE.

THE RIGGING FOR THE LOWER MASTS.

SHROUDS. The cablet is warped round two iron fids, fixed in the floor, as diſtant from each other as the firſt warp is long. The length, which is the diſtance from the top of the bolſters at the maſthead to the foremoſt dead-eye, is ſpecified in the Table of Dimenſions. One end of the cablet is made faſt to the lower fid, and paſſed round the upper fid; and ſo on, alternately, one turn cloſe to the back of the other, and each hauled tight by hand. The additional length, gained by the turns lying round each other, is ſufficient for the lengthening of each pair of ſhrouds, as they rake aft. When the whole gang of ſhrouds are warped out, the bights at the lower end are cut through, in a ſtrait direction with the fids.

The upper bights are deſigned for the eyes, and are marked round the middle, beginning at the inner one, with one piece of ſpun-yarn knotted, two for the ſecond; and ſo on for the number required.

The outer turn is called SWIFTERS; and they are left four or five feet at each end longer than the ſhrouds, and have an eye ſpliced in them the circumference of the maſt-head.

The ſhrouds, when cut to their length, are got up and ſtretched thus for worming: at the end of each length is made a bend; one end is paſſed through a pair of ſlings, fixed round a poſt, at the lower end of the houſe, and the other end through the ſtrap of a treble block, and a fid thruſt through each bend. The treble block is connected by its fall to a double block, laſhed round a poſt, at the upper end, thus: The ſtanding part of the fall is faſtened to the becket, at the arſe of the double block; then reeved through the firſt ſheave of the treble block, then through the firſt ſheave of the double block on the ſame ſide, and ſo on alternately, and the fall carried and attached to the windlaſs by three or four round turns. The windlaſs is put in motion by men, with levers, or handſpecs, and each length thus ſtretched, hand-tight.

The rope uſed for the fall is commonly five-inch white rope.

All ſhrouds are wormed with double ſpun-yarn, one-fourth the length from the center to the eye, on each ſide; but the fore-leg of the foremoſt pair is wormed all the way to the end.

Each length after being wormed, is hove out by the ſame purchaſe, till each pair has acquired, by ſtretching, once and a half the length of the eye; and ſhould remain on that ſtretch twenty-four hours before the ſervice is laid on.

Shrouds are wormed before they are hove out to lengthen, becauſe the worming of cable-laid ropes encreaſes, in tenſion, with the rope; and thereby draws ſmooth and even into the cuntline.

The eyes of all ſhrouds are parcelled with worn canvas, well tarred; about one fathom and a half on each ſide of the middle, for large ſhips, and proportionably for ſmaller; and then ſerved with ſpun-yarn one-fourth of their length: each turn of the ſerving is laid cloſe, and ſtrained tight round, to prevent the water penetrating. The fore-leg of the foremoſt pair of ſhrouds is ſerved the whole length.

Swifters, when ſtretched, have the length of the ſplice ſet off on each ſide of the middle; and likewiſe the length of the eye, or circumference of the maſt-head. The latter is parcelled and ſerved as above. They are then cut aſunder in the middle, and ſpliced to the circumference of the maſt-heads; then got on the ſtretch, and ſerved over the ſplice one-fourth of the length.

The bights of ſhrouds are ſeized together to the circumference of the maſt-heads: the ſeizing of the firſt ſhroud is put on below the bolſter, or treſtle-trees, with ſeven under and ſix riding turns, and a double croſs turn over all. The ſeizing of each ſhroud is to be laid its breadth below the next, and clear of each other, to prevent chafing.

Brigs have four pair of ſhrouds forward; and the foremoſt ſhroud and pendent are in one.

BOWSPRIT-SHROUDS are made of cable-laid rope. They have an iron hook and thimble ſpliced in the inner ends, and are ſerved over the ſplice.

STAYS have an eye in one end, ſufficiently large to reeve itſelf through.

Each ſtay is got upon the ſtretch, and hove well out with the windlaſs, as the ſhrouds are; then wormed with ſpun-yarn one-third of its length; and is hove out a ſecond time, till the middle ſtrand, or heart, is made to break in ſeveral places.

The mouſe, made with ſpun-yarn, in the ſhape of a pear, is then raiſed on the ſtay, at one-third of its length. By ſome, but, by others, two ſides of the maſt-head, added to twice the length of the treſtle-trees, gives the length from the eye to the mouſe. The ground of the mouſe, or the length from the ſhoulder, or upper part, to the beginning of the tail, is one-third the circumference of the ſtay; or elſe is laid with as many turns in length as the ſhoulder is raiſed above the ſtay, which ſhould be in circumference three times that of the ſtay, and from that to diminiſh to the ſhape in the plate, by gradually leſſening the turns in the ſpun-yarn: every turn of the ſpun-yarn to be hove well tight with a large ſerving mallet, and beat cloſe. Between the turns of the ſpun-yarn are laid ſeveral rope-yarns, lengthways, and their ends brought back over the next turn from the ſhoulder, which prevents their ſlipping. When all the turns are laid, it is parcelled over with worn canvas, well tarred, pegged on, and pointed over with inch or three-quarter rope; each knittle to be in length five times the circumference of the ſtay, to have an even number, and hove tight when paſſed. The ſhoulder of the mouſe muſt be covered with knittles, and their number diminiſhed as they are worked into the ſmaller parts. The ends of the knittles are ſtopped with ſpun-yarn, at the front, with a ſecure ſeizing. The warp to be marline, and the pointing continued the circumference of the ſtay for the length of the tail. The collar, the eye, and one fathom below the mouſe, are parcelled with worn canvas, well tarred, and ſerved over with ſpun-yarn.

BOBSTAYS are wormed, parcelled, and ſerved with ſpun-yarn three-fourths of the length.

COLLARS. Fore-stay-collars are fitted to the circumference of the bowſprit, and ſpliced together at the ends; wormed, parcelled, and ſerved the whole length; then doubled, and a heart ſeized in the bight. The ſplice is to lie on the back of the heart with quarter ſeizings, a ſcore being cut on each ſide of the heart, large enough to admit from nine to twelve turns of ſeizing; the ſeizing is to be ſnaked on the back, to lie cloſely.

MAIN-STAY-COLLAR is made by the rope-makers, with an eye in one end; is wormed, parcelled, and ſerved round the eye, and the whole length.

PREVENTER-STAY-COLLARS are fitted to the circumference of the bowſprit, with an eye ſpliced in each end for laſhing; then wormed, parcelled, and ſerved with ſpun-yarn from eye to eye; and a heart ſeized in the bight, as in the fore-ſtay-collar.

BOWSPRIT-SHROUD-COLLAR and BOB-STAY-COLLARS are fitted to the circumference of the bowſprit: They have an eye ſpliced in each end; are then wormed, parcelled, and ſerved from eye to eye; and a heart ſeized in the bight, with a long and ſhort leg, with ſeven under and ſix riding turns, well ſtrained, and croſſed with two turns: the end whipt, and ſecured with a wall-knot crowned.

CATHARPIN-LEGS are four in number. The foremoſt is the ſhorteſt, and they increaſe one inch in length as they go aft. The length of the foremoſt one is from four feet in ſmall, to eight feet in large, ſhips. They have an eye ſpliced in each end for laſhing; are then wormed, parcelled, and ſerved with ſpun-yarn from eye to eye.

HORSES for the yards have an eye ſpliced in one end, the circumference of the yard-arm, and ſerved with ſpun-yarn over the ſplice.

JIB-HORSES are doubled, and ſerved with ſpun-yarn one fathom in length in the bight, and knotted with a over-hand knot, at the diſtance of every yard.

PENDENTS OF TACKLES are wormed, parcelled, and ſerved with ſpun-yarn, in the way of the cunt-ſplice. They are then ſpliced in the middle, to the circumference of the maſt-head; have large thimbles ſpliced into the lower ends; are then wormed, parcelled, and ſerved with ſpun-yarn the whole length.

Large ſhips having two pair of pendents to the main and fore maſts, the after pendents are one foot longer than the foremoſt ones.

YARD-TACKLE-PENDENTS have an eye ſpliced in one end to the ſize of the yard-arm, and a double block in the other end. The ſplices are ſerved over with ſpun-yarn.

BRACE-PENDENTS have an eye ſpliced in one end to the ſize of the yard-arm, and a ſingle block in the other end. The ſplices are ſerved over with ſpun-yarn.

PREVENTER-BRACE-PENDENTS are ſpliced through the ſtrap of the brace-pendent-block; ſerved with ſpun-yarn over the ſplice; and are left the length of the ſervice of the ſplice and length of the eye longer than the brace-pendent, with an eye ſpliced in the other end to the circumference of the yard-arm.

TRUSS-PENDENTS are doubled, and cut in the bight: they have an iron thimble ſpliced into one end, and are ſerved with ſpun-yarn one-third of the length.

MAIN-STAY-TACKLE-PENDENTS have an eye ſpliced in one end, and a double block in the other, and ſerved with ſpun-yarn over the ſplices.

QUARTER-TACKLE-PENDENT is ſpliced into the ſtrap of the double block; ſerved with ſpun-yarn over the ſplice, and the other end whipt.

MIZEN AND TOPMAST BURTON-PENDENTS have a cunt-ſplice in the middle to the circumference of the maſt-head; thimbles ſpliced in the lower ends; and ſerved with ſpun-yarn over the ſplices.

GUY-PENDENTS are doubled, and ſerved with ſpun-yarn in the bight, one fathom in length.

VANG-PENDENTS are doubled, and ſerved with ſpun-yarn two fathoms long in the bight, and a double block ſpliced into each end, and ſerved with ſpun-yarn over the ſplices.

RUNNERS OF TACKLES have a double block ſpliced in one end, and ſerved with ſpun-yarn over the ſplice, and the other end whipt.

SLINGS AND STRAPS. The ſtrap has an eye ſpliced in each end, with a long and ſhort leg, to the circumference of the yard, and ſerved with ſpun-yarn from eye to eye, with a thimble ſeized in the bight.

Slings have an eye ſpliced in one end; then wormed, parcelled, and ſerved almoſt the whole length. The ſpritſail ſlings are wormed, and ſerved with ſpun-yarn.

SPANS about the maſt have a ſingle block ſpliced in one end, and ſerved with ſpun-yarn the whole length, except what is left at the other end to ſplice in another block on-board.

LONG AND SHORT SPANS have a ſingle block ſpliced in each end, and the ſplices ſerved over with ſpun-yarn. One end is finiſhed in the houſe, the other in the top, after they are hitched round the cap.

STANDING-LIFTS have an eye ſpliced in one end, and are ſerved with ſpun-yarn over the ſplice.

BECKETS are whipt at each end.

TYES are wormed, parcelled, and ſerved with ſpun-yarn for three-fourths of their length.

TACKS, MAIN AND FORE, are cable laid, and are tapered in the making. The biggeſt end is opened out long enough to heave the knot cloſe together: the knot is double-walled and crowned; the ends are thruſt through the walling, then ſcraped down, ſerved over with ſpun-yarn, and wormed, parcelled, and ſerved with ſpun-yarn one-fourth of the whole length.

THE RIGGING TO THE TOPMASTS.

SHROUDS are warped out on the floor, as the lower ſhrouds are, and fitted to the circumference of the topmaſt-head.

In the foremoſt ſhrouds, on each ſide, is ſeized a ſiſter block, below the futtock-ſtaff.

STANDING-BACKSTAYS are wormed, and ſerved with ſpun-yarn, in the way of the top-brim. They are fitted as the ſhrouds are, except that the third pair is tongued together the circumference of the topmaſt-head: the tongue is a ſhort piece of rope of the ſame circumference as the ſtay, and is ſpliced into the ſtrands of the ſtay; the ends of the tongue are tapered, marled down, and ſerved over with ſpun-yarn.

BREAST-BACKSTAY-RUNNERS are doubled, and cut in the bight. They have a double block ſpliced in one end; are ſerved with ſpun-yarn over the ſplice; and the other end is whipped.

STAY is fitted as the lower ſtay is. The collar is in proportion to the topmaſt-head.

PREVENTER-STAY, the ſame as the ſtay.

COLLARS have an eye ſpliced in one end, are wormed and ſerved with ſpun-yarn, and have a ſingle block ſeized in the bight.

The FORE-TOPMAST-STAY-COLLAR is ſeldom uſed; but it is prepared in caſe the bees of the bowſprit ſhould be carried away. Ships, however, that have no bees to the bowſprit, make uſe of this collar.

FUTTOCK-SHROUDS. The length given in the Table of Dimenſions is divided into four, and cut in the bights. Each length has a hook and thimble ſpliced into each end, and the ends of the ſplices ſtopped with ſpun-yarn; then doubled, and a ſpun-yarn tied in the middle for the cutting mark. The hooks are then hooked in each other, and got upon the ſtretch. They ſhould be well

hove out, to try the hooks and ſplices, as the topmaſt depends very much thereon. If a hook ſhould break, or the ſplices draw, the former muſt be ſhifted, and the latter hauled tighter through.

After they are ſufficiently ſtretched, the ends of the ſplices are tapered, marled down, and ſerved with ſpunyarn within two feet of the cutting mark: they are cut aſunder, and the ends whipt.

FUTTUCK-STAVES are wormed, parcelled, and ſerved with ſpunyarn the whole length; and then cut to the lengths wanted on-board.

TOP-ROPE-PENDENTS have a large iron thimble ſpliced in the lower end; are marled over the ſplice in the rigging houſe, and pointed when got on-board.

REEF-TACKLE-PENDENTS have a double block ſpliced in the end, and are ſerved with ſpunyarn over the ſplice.

TYE has a double block ſpliced in the lower end, and is ſerved with ſpunyarn over the ſplice.

PARRAL-ROPES have an eye ſpliced in each end; are wormed, and ſerved with ſpunyarn from eye to eye: they are then doubled, and cut aſunder in the bight. The end of one is thruſt through the upper hole in the ribs; and through the hole in the middle of the trucks, and ſo alternately. The other end is brought the reverſe way through the lower hole in the ribs and trucks.

THE RIGGING FOR THE TOPGALLANT MASTS.

SHROUDS are fitted as the topmaſt-ſhrouds are, except that, inſtead of a ſiſter-block, a thimble is ſeized in the two foremoſt pair on each ſide, cloſe up to the hounds.

STANDING-BACKSTAYS are fitted as the ſhrouds are; wormed, and ſerved in the way of the top-brim.

STAY is cable-laid in large ſhips, and hawſer-laid in ſmall ones. The latter has an eye ſpliced in the upper end to the circumference of its maſt-head, and ſerved with ſpunyarn over the ſplice. The cable-laid is fitted with a collar, and mouſed, as any other ſtay.

STRAPPING OF BLOCKS.

The whole length of all the different ſizes of block-ſtrapping is got upon the ſtretch, and hove out tight for worming and ſerving; it is then wormed and ſerved, and cut into ſhorter lengths, to ſuit the different blocks.

The ſtrapping of jeer-blocks is wormed, parcelled, and ſerved. Strapping of four inches diameter, and above, is wormed and ſerved: and all under four inches is only ſerved with ſpunyarn; except the ſpritſail-brace, buntline, and leechline blocks, that are laſhed under the tops, which are only ſerved with ſpunyarn over the ſplice, and the tail left half a fathom in length.

Jeer-blocks are double ſcored; and the double and treble blocks are ſtrapped with a double ſtrap, thus: it is ſpliced together at the ends, and, when doubled, to be the ſize of the block and circumference of the yard. It is then doubled, and the block ſeized in the bight, with a long and ſhort leg; the ſplice lying in the arſe of the block.

The ſcores of all blocks are to be well tarred, and the pin and ſheave examined, before the ſtrap is put on. The block is ſet well into the ſtrap with wedges, thus: the four parts are frapped together with rope-yarn under the block, with a chock between, and the wedges are ſet between the breaſt of the block and chock. Then the ſtrap is nippered, with a heaver, round the block; the wedges, chock, and frapping, taken away, and the block hung upon the ſtake-head, or poſt, and the ſtrap well ſeized together, cloſe under the block, with nine under and eight riding turns, every turn ſtrained tight round by a heaver, and croſſed each way with two turns.

Jeer-blocks, for the mastheads, are strapped with long eyes, to receive many turns of the lashing; and the block is seized into the strap, as before; as are all seizing blocks, in proportion to their sizes. The straps are cut agreeable to the following Table.

A TABLE OF THE DIMENSIONS OF STRAPS FOR LASHING AND SEIZING BLOCKS.

Size of the blocks.	Circumf. of the straps.	Length of the straps.		Size of the blocks.	Circumf. of the straps.	Length of the straps.	
Inches.	Inches.	Feet.	Inches.	Inches.	Inches.	Feet.	Inches.
17	5	7	4	10	3	3	9
16	$4\frac{1}{2}$	6	8	9	$2\frac{1}{2}$	3	4
15	4	6	0	8	$2\frac{1}{2}$	3	0
14	$3\frac{1}{2}$	5	4	7	$2\frac{1}{2}$	2	9
13	$3\frac{1}{2}$	4	11	6	2	2	6
12	$3\frac{1}{2}$	4	6	5	$1\frac{1}{2}$	1	9
11	3	4	2	4	$0\frac{3}{4}$	1	6

Blocks, strapped with eyes or thimbles spliced in the ends, are seized tight into the bight, and the legs left long enough to lash through the eyes, round a mast, yard, &c. as the topsail clue-lines, clue-garnets, and spritsail clue-lines, &c.

Blocks strapped with a thimble, or hook and thimble, have the strap spliced together at the ends. The block is fixed in one bight, for the splice to lay on the arse of the block, and the thimble in the other bight; the seizing is put on, between the block and thimble, with eight under and six riding turns, according to the size of the block, each turn strained tight by a heaver; the turns double crossed, and the end stopt with a wall-knot crowned.

Blocks strapped with double tails, are fixed in the strap, similar to blocks with eye-straps; and those with a single tail are spliced in, and served with spunyarn over the splice.

Girtline-blocks are strapped in the house, and the girtlines reeved.

In the Table of Dimensions for standing and running rigging will be found dimensions of all blocks for their respective uses and situations.

NECESSARY ROPES FITTED IN THE RIGGING-HOUSE.

WINDING-TACKLE-PENDENT has an eye spliced in one of the ends; the ends put in three times, and cut off short; the other end is whipt.

FISH-TACKLE-PENDENT has a large iron hook, with a thimble spliced in one end; and the ends of the splice tapered, marled down, and served over with spunyarn.

BILL-PENDENT has a hook and thimble spliced in one end, and served with spunyarn over the splice.

RUDDER-PENDENTS are doubled and cut in the bight; they have a hook and thimble spliced in one end, and are served with spunyarn over the splice.

DAVIT-GUYS have an eye spliced in one end to the circumference of the davit-head; are served with spunyarn over the splice; and whipt with spunyarn at the other end.

STOPPERS, DECK and BITT, are divided into ten short and two long stoppers. The two long stoppers, from a first rate ship to a sloop, are cut sixteen feet; and, when knotted, to be twelve feet six inches. The short stoppers are each cut twelve feet six inches; to be, when knotted, eight feet three inches long. One end of each stopper has a double wall-knot, and the ends led up through the middle, and whipt with spunyarn: the other end is only whipt with spunyarn.

BUOY ROPES. One end is unftranded for one yard in length, ftopped with rope-yarn, and one of the nine fmaller ftrands taken out of each of the three larger ftrands, which are then laid together again. The three fmaller ftrands are double-walled right-handed clofe to the ftop, then laid up their cuntlines, and three fathoms next the knot wormed, parcelled, and ferved with fpunyarn.

When two or more buoy ropes are knotted at the fame time, after the knot is formed on each, the ends are fpliced together, and the other ends made faft to tackles, and hove tight, which ftrains the knots clofe and firm. If a fingle buoy rope be knotted after the knot is made, make a bend at one end, and attach a tackle to it, and make faft the other end; then bowfe upon the tackle, and clofe the knot as before.

DIMENSIONS OF BUOY SLINGS.

Merchant Ships.	Rate.	Number of Guns.	Size of the Buoy.		Slings. Length cut out.		Slings. Length hove out.		Length of the Hoop.		No. of slings.	No. of hoops.
			Feet.	Inch.	Feet.	Inch.	Feet.	Inch.	Feet.	Inch.		
	First	110 & 100	4	8	12	9	10	10	5	10	4	2
	Second	98 & 90	4	7	11	11	10	8	5	9		
	Third	80, 74 & 64	4	6	11	8	10	6	5	8		
Eaft India fhips.	Fourth	60 & 50	4	2	10	10	9	8	5	0		
	Fifth	44 to 32	3	10	10	2	8	11	4	4		
Weft India fhips.	Sixth	28 & 24	3	6	9	2	8	2	3	10		
	Sloops	16 & 14	2	10	7	10	6	8	3	5		
Merchant Veffels, 200 tons & under.	Cutters		2	6	7	0	6	2	3	3		
	Brigs		2	3	6	6	5	8	3	0		

BUOY-SLINGS are cut to the firft length in the table; and have an eye fpliced in each end, large enough to reeve the fame fized rope: they are then got on the ftretch, and hove out to the next length; then wormed, and ferved with fpunyarn from eye to eye.

BUOY-HOOPS are cut fixteen inches longer than the length in the table, to allow for fplicing the ends together. In the merchant fervice they are wormed and ferved; but not in the king's fervice.

Each hoop is fixed its breadth within the fecond iron hoop, at each end, and is reeved through the eye in the end of the flings, before the ends are fpliced together. Each fling is doubled, and two flings are fixed at each end of the buoy. The eyes of the flings, at one end, lead down through the upper hoop, and reeve on the lower hoop; and the eyes of the flings, at the other end, lead up under the lower hoop, and reeve on the upper hoop, between the upper flings.

The hoops are drawn afunder, fufficiently to force the buoy between them; are then put over the ends of the buoy, and the flings and hoops got into their places, as near as poffible. The flings are placed on the quarters, equally between each other; and the bights fixed in fcores, in the ends of the buoy. It is next got upon the ftretch: one end of the flings is made faft to a poft, and the other end to a tackle, whofe fall is fwayed tight, or hove fo by a heaver. When the buoy is thus fet tight, the hoops are driven by a mallet into their places; and the bight of the flings is feized well together, with a thimble in one end, and an eye at the other. Large buoys have feven under and fix riding turns fmaller buoys fix under; and five riding turns; the end of the feizing croffed each way, and the end knotted and crowned. A fid is driven in the eye, to make it round, then driven out, and the two bights marled together.

Another thimble is turned into the thimble in the other end, for bending the buoy rope to.

GUN AND NUT SLINGS are ſpliced together with a ſhort ſplice, and ſerved with ſpunyarn over the ſplice.

BUTT AND HOGSHEAD SLINGS. Each pair has a thimble ſpliced in one end, which is ſerved with ſpun-yarn over the ſplice; the other end is whipt.

CAN-HOOK SLINGS. A flat broad iron hook, with an eye in one end; is ſpliced through the eye in each end of the ſlings, and ſometimes with a thimble ſeized in the bight.

PUDDENING OF ANCHORS. Worn hawſer-laid rope is cut into lengths three times the diameter of the ring; and as many of theſe lengths as will cover the ring, which is about thirteen. The ring is firſt chocked upright, by wedging it in the hole of the ſhank; then well tarred, and parcelled with worn canvas, twice round, and marled down cloſe with ſpun-yarn. The turns of the puddening are then paſſed, one turn and a half each way from the middle of the ring; then hove tight by a heaver, and well ſeized with two quarter and two end ſeizings, that are ſnaked all round. The ends remaining are opened out, and payed all over with a good coat of tar.

WOOLDINGS, round maſts or bowſprits, are performed by a machine, called a horſe, made with two cheeks of oak plank, and a ſmall windlaſs in the middle: one end of the cheeks reſt upon the ground, the other againſt the maſt or bowſprit, being hollowed to fit their convexity. The number of turns of each woolding is from thirteen to fifteen. The firſt turn is whipt at the end with ſpun-yarn, and nailed, to the maſt or bowſprit, with three nails, and a leather button under the head of each nail. The turns are paſſed cloſe together ſingly, and every turn hove tight, by the windlaſs being made faſt to the middle, with a hitch round an iron pin, and then hove with two levers or handſpecs, one at each end. Every turn, when hove tight, is faſtened with a nail and leather button, each nail being regularly below the other to the middle turn, and then above,

The number of wooldings on a main maſt are from ten to twelve, according to its length, or one woolding between every hoop. The foremaſt has one woolding leſs than the main-maſt. Mizen-maſts and bowſprits have one woolding under the hounds, and near the outer end of the bowſprit.

PROGRESSIVE METHOD OF RIGGING SHIPS.

THERE is no one undeviating mode which is purſued in the progreſſive rigging of ſhips. It is an operation which muſt at all times depend upon the time allotted for its performance, and the neceſſity of immediate fitting. The nature of it, however, is ſuch, that all parts may be advancing at the ſame time: but the uſual method of proceeding, where extreme expedition is not required, is the following:

Firſt, rig the bowſprit; then get the lower rigging over the maſts. Next, get up the topmaſt and their ſhrouds: then get on board and rig the lower yards; then the topſail-yards: and, laſtly, get up the topgallant-maſts, with their rigging and yards.

The performance of each part is now here treated of, the bowſprit and lower maſts being fixed.

BOWSPRIT.

HORSES. The outer ends are ſpliced round a thimble cloſed through an eye-bolt on each ſide of the upper part of the bowſprit-cap. The inner-ends have a thimble ſeized in, that ſets up to the eye-bolt in the timber-head, on each ſide the ſtem, by a laniard, paſſed ſeveral times alternately through the thimble and eye-bolt, and ſet tight by hand: the turns are then frapped together, and the end hitched.

GAMMONING. Nine or eleven turns of the rope are paſſed overthe bowſprit and through a hole cut in the knee of the head alternately; (but, where there is no knee, through a large triangular ring-bolt driven through the ſtem.) The firſt end is whipt and paſſed through the hole, and over the bowſprit, with a round turn, then clinched round the bowſprit cloſe againſt the cleats; the other end paſſes through the fore-part of the hole, taking care to croſs every turn, and keep each turn forward on the bowſprit, and aft in the hole, and every turn is hove tight and nipper'd. In the navy, the bowſprit is firſt heaved down by a chain-boat. A ſelvage is faſtened round the bowſprit next the ſaddle, for the ſpritſail-ſlings, to which a block is hooked, and through it a pendent is reeved, having one end made faſt to an eye-bolt in one ſide the boat, and a luff-tackle to the other end, whoſe fall is connected with the windlaſs, and heaved tight by handſpecs; the fall is then ſtopped with ſpun-yarn, and taken off the windlaſs. Each turn of the gammoning-rope is then heaved tight as above. A leading-block is laſhed through an eye-bolt, in the bow of the chain-boat, or round the davit, and a pendent reeved through, with an eye ſpliced in one end, through which a bight of the gammoning-rope is paſſed, and retained by means of a toggle. To the other end of the pendent is hooked a luff-tackle, whoſe fall is connected with the windlaſs, and heaved tight as before. The luff-tackle is over-hauled by a ſmall jigger-tackle, made faſt to the davit-head and ſtrap of the luff-tackle block. In merchant-ſhips, chain-boats are ſeldom uſed. Their own long-boats or caſks of water are heaved up to the bowſprit end, and every turn of the gammonning-rope is conected with the windlaſs or

capftern, on-board. A leading block is made faft through the holes, for the bob-ftay, with tails, long enough for the pendent and tackle, to lead ftraight through the hawfer-holes to the windlafs. The procefs as before.

When all the turns are paffed, and hove tight, they are frapped together in the middle, by as many crofs turns as are paffed over the bowfprit, each turn hove tight: the end of the gammoning rope is then whipt, and feized to one of the turns. The frapping increafes the tenfion; and adds to the fecurity acquired by the purchafe.

THE BOBSTAY-COLLAR is lafhed upon the upper fide, two-thirds out, or within the faddle for the fpritfail flings, with eight or ten turns, each turn paffing, alternately, through the eyes, and hove tight by a heaver.

THE SHROUD-COLLARS are lafhed upon each fide the bowfprit, as before.

FORE-PREVENTER-STAY-COLLAR, AND FORE-STAY-COLLAR. The latter ftops againft cleats, nailed to the bowfprit, to prevent its coming in, and both are lafhed under the bowfprit. A ftage is made for this purpofe, of two long fpars, or the topmaft ftudding-fail-booms, and a grating. One end of the fpars refts upon the gunwale, on each fide the bowfprit, and the outer ends are lafhed to the bowfprit, and the grating is laid under the collars.

BOB-STAYS. Kings fhips have two pair of bob-ftays, merchant fhips commonly but one pair. They are ufed to confine the bowfprit downwards, and are fixed by paffing one end through a hole bored in the knee of the head; (merchant fhips, that have no knee, have large triangular bolts driven through the ftem, and clenched on a plate of iron, infide;) the ends are then fpliced together, to make it twofold, or like the link of a chain. A heart, or dead-eye, is feized in the bight, with a fplice at the arfe of the heart, the fame as the collar; a laniard then paffes through, and connects with the heart, or dead-eye, in the collar under the bowfprit, and fets up tight, with a luff-tackle upon luff, and leads in upon the forecaftle. The ufe of the bobftay, is to draw down, and keep fteady the bowfprit, to counteract the force of the ftays of the fore-maft, which draw it upwards.

SHROUDS hook to an eye-bolt on each fide the bow; the fore-maft end has an heart, or dead-eye, feized in, that it may fhift nearer in, as the rope ftretches; the fhrouds are then fet tight as the bob-ftay. The fhrouds are to fortify the bowfprit, as the fore-maft and upper part of the main-maft are ftayed and fupported by the bowfprit.

J I B - B O O M.

THE TRAVELLER, or round iron hoop, is firft put over the outer end of the jib-boom, with a hook and fhackle; the hook is kept inwards to hook the tack of the jib to.

HORSES. The bight is taken over the outer end of the jib-boom with a jambing-knot, and refts againft a fhoulder, made in the end of the jib-boom, to prevent its coming in. The inner ends are brought in and made faft, with a round turn round the jib-boom, within the cap. The ends are ftopt back, with two or three feizings of fpun-yarn, to prevent their being caft off by miftake.

GUY-PENDENTS are put over the jib-boom, the fame as the horfes, and the inner ends reeve through a thimble, on the quarters of the fpritfail-yard, and turn into the ftrap of a double block, with a throat and round feizings, which is connected, by its fall, to a fingle block, that hooks to an eye-bolt, near the cat-head, and leads in upon the fore-caftle.

A STRAP is put over the end of the jib-boom, with three thimbles feized in it; the middle thimble is the largeft, which the fore-topgallant-ftay reeves through, and the fmaller thimble on each fide has the fore-top-gallant bowlines reeved through.

SPRITSAIL-YARD.

HORSES. The eye in the outer end is put over the yard-arm on each ſide, and ſtops againſt the cleats; the other end has an eye ſpliced in and ſeized to the yard three feet beyond the ſlings. The horſes hang three feet below the yard. To keep horſes more parallel to the yard, they are ſuſpended at proper diſtances by ropes, called

STIRRUPS, two or three on each ſide the ſlings, having a thimble or eye ſpliced in their lower ends. They hang three feet below the yard, through which the horſe reeves. The upper ends are opened and plaited, to lie flat to the yard: they have three turns round the yard, and are nailed. A flemiſh horſe is uſed at each arm of the yard, having an eye ſpliced in each; one eye is put over the bolt in the yard-arm, the other ſeized within the cleats.

BRACES AND PENDENTS. The eyes of the pendents are ſpliced in one end. They go over the yard-arm, and the brace reeves through the ſingle block ſpliced in the other end, connecting them with a double block, made faſt under the fore-top, and then leads through another, made faſt at the aft part of the top, and down to the breaſt-work at the aft part of the fore-caſtle, and the ſtanding part is made faſt to the ſtay-collar.

LIFTS. The blocks are ſtrapped with an eye to the ſize of the yard-arm, and put neatly over the yard-arm:

A SPAN is then paſſed round the cap under the jib-boom, with a hitch, and has a ſingle block turned into each end. After which one end of the lifts reeve through the ſingle block in the ſpan at the cap, then through the lift-block on the yard-arm. The ſtanding part is made faſt to an eye-bolt in the cap, and leads in upon the fore-caſtle; they are uſed for the ſpritſail-topſail-ſheets, and to keep the yard level, or to raiſe one yard-arm higher than the other, and ſupport the weight when a number of ſeamen are employed to furl or reef the ſail.

THE STANDING-LIFT has an eye ſpliced in one end, and laſhes to the yard one-fourth from the ſlings; the other end has a thimble ſpliced in, and is ſet up with a laniard to a thimble ſpliced in a ſtrap that goes round the bowſprit within the bees.

CLUE-LINE-BLOCKS are ſtrapped, with two eyes, and are laſhed through thoſe eyes round the yard, three feet without the ſlings; the laſhing to be upon the yard.

SLINGS. One end has an eye, and goes round the yard cloſe within the cleats in the middle, and ſeizes with a quarter ſeizing cloſe to the yard; the other end goes over the bowſprit before the ſaddle, and under the yard, then over the bowſprit again, and an eye is ſpliced in the end, that comes cloſe to the other eye, and laſhes.

STRAP, with a thimble ſeized in its bight, is ſpliced or ſeized round the yard in the middle, between the cleats. The ſingle block of the haliards hooks in the thimble, and is mouſed with ſpun-yarn, round the hook, to prevent its ſlipping. The long tackle block is hooked, and mouſed, to an eye-bolt in the after-part of the bottom of the cap, and the fall leads in upon the forecaſtle, and belays to the rack over the bowſprit. Alſo, on each outer quarter of the yard, is ſeized a ſtrap, with a thimble, through which are led the jib-guys,

PREVENTER-SLINGS are uſed when the haliards are taken in. The outer end has a hook and thimble ſpliced in and ſerved down, that hooks to the eye-bolt in the bottom of the cap. The inner end reeves through the thimble in the above ſtrap, and is hitched with two half hitches, or ſpliced.

SPRITSAIL-TOPSAIL-YARD.

HORSES. The eye in the outer ends is put over the yard-arm on each ſide, and ſtops againſt the cleats; the other end has an eye ſpliced in it, and is ſeized to the yard, three feet without the ſlings.

BRACES have an eye ſpliced in one end, that goes over the yard-arm on each ſide; the other end leads through a block made faſt to the underſide of the fore top, from that through another block, made faſt under the aftſide of the top, and down to the aft-part of the forecaſtle, and is there belayed.

LIFTS have an eye ſpliced in one end that goes next over the yard-arm; the other end leads through a thimble, ſeized on each ſide a ſtrap that goes over the jib-boom end, and leads in upon the forecaſtle, through a ſaddle on the bowſprit for leading in the running-ropes, and belays to the rack over the bowſprit.

CLUE-LINE-BLOCKS are ſtrapped with two eyes, and are laſhed through thoſe eyes round the yard, about two feet without the ſlings.

PARRAL-ROPE. Both ends paſs under the yard, and over the jib-boom, contrary-wiſe; they are then ſeized through the eyes, cloſe in the cavity on the back of the ribs.

HALIARD. One end reeves through a block, laſhed under the outer part of the jib-boom; then through a ſingle block, laſhed round the middle of the yard between the cleats; then forward; and is made faſt with a bend, through the becket of the block, at the jib-boom ends.

The leading-part leads in upon the forecaſtle, and belays to the rack over the bowſprit.

FORE-MAST, AND MAIN AND MIZEN MASTS.

GIRTLINE-BLOCKS are laſhed round the maſt-head, above the ſtop of the cap, one to hang on each ſide. The girtlines that reeve through them lead down upon deck, for hoiſting the rigging-tops, and croſs-trees, and the perſons employed to place the rigging over the maſt-head.

BOLSTERS, on the treſtle-trees, are clothed with old canvas, ſeveral times doubled, and tarred.

PENDENTS OF TACKLES are got over the maſt-head, and fixed, that the thimbles, to which is laſhed the block for the runner, may hang one on each ſide the maſt, and buttons over the mizen-maſt.

SHROUDS are hoiſted over the maſt-head. The firſt pair leads down on the ſtarboard-ſide forward, the next pair forward on the larboard-ſide; then the ſecond pair on the ſtarboard, and the ſecond on the larboard, and ſo on till the whole are fixed. By this method, the yards are braced to a greater degree of obliquity, when the ſails are cloſe hauled, which could not be, were the foremoſt ſhrouds laſt fitted on the maſt-head.

SWIFTERS are ſwayed over the maſt-head, next above the ſhrouds; and are fixed on the ſtarboard and larboard ſide of the maſt. They are extended from the maſt-head to the ſtarboard and larboard ſides of the ſhip, to ſupport the maſts, and enable them to carry ſails, &c.

THE STAY is hoiſted over the maſt-head, and ſupports the maſt on the forepart, by extending from its upper end towards the fore part of the ſhip.

THE PREVENTER-STAY is next hoiſted over the maſt-head, the ſame as the former.

THE TOP is next got over the maſt-head, by the girtlines. Four holes are bored through; one in the middle of the ſquare hole on each ſide, and two in the forepart, four inches on each ſide the middle of the top, except the mizen-top, which is bored in the aft part. The top is hoiſted onboard by the girtlines, and placed up againſt the aftſide of the maſt, except the mizen, which is to be placed on the foreſide. The girtline is made faſt, for hoiſting the top over the maſt-head, as

follows: reeve one end of each girtline through the hole by the middle of the ſquare hole, and take a whole round turn round the ſides of the top; make it faſt to the ſtanding part, with two half hitches, and ſtop it with ſpun-yarn through the midſhip holes in the fore part, except the mizen-top, which is ſtopt at the aft part. The girtline at the next maſt-head is made faſt to the aft part of the main and fore top, and fore part of the mizen-top. The top is then hoiſted by its girtlines over the maſt-head, and guyed clear of the treſtle-trees by the girtline from the next maſt-head. When it bears againſt the maſt-head, the ſtops are cut, and the top is ſwayed up till it goes over the maſt-head and falls to its place.

DEAD-EYES are then turned into the lower end of the ſhrouds, left-handed, (being cable-laid rope,) with a throat-ſeizing clapt on cloſe to the dead-eye, and above that a round ſeizing croſſed, and the end of the ſhroud whipt with ſpun-yarn, and capped with canvas well tarred.

LANIARDS are reeved through the dead-eyes: the end of the laniard is thruſt through the after-hole of the upper dead-eye, and ſtopt with a walnut-knot, to prevent its ſlipping; the other end is paſſed through the after-hole of the lower dead-eye, and, returning upwards, is conveyed through the ſecond hole in the upper dead-eye, and next through the ſecond hole in the lower dead-eye, and finally through the third hole in both dead-eyes. The end of the laniard, being directed upwards from the lower dead-eye, is ſet up by the runner and tackle, which hooks in the runner-pendent: a luff-tackle is alſo hooked to a ſelvagee in the ſhroud, and the lower part hooked to the laniard with a cats-paw, and bowſed tight: the fall is then made faſt to the hook of the runner with another cats-paw; the runner is ſwayed up very tight, and the laniards are then nipped together with a ſtrand or rope-yarn. To make the whole ſlide with eaſe through the holes in the dead-eyes, it is ſmeared with tallow, that all the turns may bear an equal proportion of the ſtrain. When the ſhrouds are ſet up for a full due, (which is when the maſt is ſtayed forward and the ſtays all ſet up,) the laniard is nipped, or ſtopt, as before obſerved, and the end paſſed betwixt the throat-ſeizing, and the dead-eye, with a hitch, then brought round all the parts, in turns, to expend the laniard, and the end is well ſtopt to the ſhroud with ſpun-yarn. It is cuſtomary to ſet up the ſhrouds the firſt time, with temporary laniards of worn rope, and ſpun-yarn ſeizings; and the proper laniards and ſeizings, when ſet up the laſt time for ſea.

FUTTOCK STAVES are ſeized along the lower ſhrouds horizontally, as much below the upper-ſide of the treſtle-trees as the cap is above. The ſhrouds are then ſwiftered together: viz. a ſpar is laſhed to the outſide of the ſhrouds about ſix feet below the futtock-ſtave; a ſingle block is then laſhed round each ſhroud and ſpar, (except the fore and after ſhrouds,) ſo that all come in together; the ſwifting-line is then reeved through each block, from ſide to ſide, beginning in the middle, one end leading aft, the other forward; it then croſſes, and reeves through two leading-blocks, one on each ſide the deck, and is bowſed tight till the ſhrouds come into the length of the catharpin legs, which are ſeized at each end, round the futtock-ſtave and ſhroud.

RATLINGS are faſtened horizontally to the ſhrouds, at regular diſtances, from the futtock-ſtaff downwards, and ſmall ſpars or boat-oars are ſeized to the ſhrouds, about five feet aſunder, for the men to ſtand upon. The firſt ratling to be thirteen inches below the futtock-ſtaff on the lower ſhrouds. The ratlings are faſtened round each ſhroud with a clove-hitch, except at the ends, which have an eye ſpliced in and ſeized round the ſhroud. Each ratling is placed thirteen inches aſunder. The fore and aftermoſt ſhroud are left out for the firſt ſix ratlings down from the futtock-ſtaff; and likewiſe the ſix lower ratlings next the dead eyes. The topmaſt-ſhrouds are rattled in the ſame manner; the firſt ratling thirteen inches belowthe futtock-ſtaff, and rattled throughout. The ſwifters on the

lower ſhrouds are then removed lower down, half way between the dead-eyes, and bowſed tight, there to remain.

THE CAP is next ſwayed up into the top by the girtlines.

TOPMASTS.

THE GIRTLINES are now taken down from the maſt-head, and one of the top-blocks is ſecurely laſhed round the maſt-head below the cap. The end of a hawſer then leads up from aft outſide the treſtle-trees, and reeves through the top-block at the maſt-head, then leads down inſide the fore part of the treſtle-trees, and reeves through the ſheave-hole in the heel of the topmaſt, and is racked to the topmaſt in two or three places between the heel and the hounds. It is there well ſtopt with three-fourth laſhing, and enough of the end left to make faſt round the maſt-head. The other end of the hawſer is conveyed to the capſtern through a ſnatch-block that is laſhed faſt to the bits at the aft part of the maſt. When the topmaſt is hove high enough to enter the treſtle-trees, the end of the hawſer is made faſt round the maſt-head. The men in the top ſtand ready to place the cap over the head of the topmaſt, and ſtop it with laſhing, a little below the hounds, in a ſecure manner. The topmaſt is then hove high enough for the cap to enter over the lower maſt-head, and then lowered a little, and the cap beat down firmly on the maſt-head with malls, when the laſhing is taken off. This method is uſed in ſhips where the cap is too heavy to be got over the maſt-head by the hands in the top. As the topmaſt is elevated the rackings are cut.

The cap being firmly fixed on the lower maſt-head, the top-rope-pendent is reeved through an iron bound block, hooked through an eye-bolt on one ſide of the cap, then downwards, and reeved through a hole with a ſheave in the heel of the topmaſt, and brought upwards on the other ſide of the maſt, and made faſt to an eye-bolt in the cap on the oppoſite ſide the top-block. To the lower end of the top-rope-pendent is hooked, through the thimble, the block of the top-tackle, connected by its fall to a block hooked to an eye-bolt in the deck, and brought to the capſtern. The topmaſt croſs-trees are ſwayed up into the top with the girtline, and got over the topmaſt-head by the men in the top. The girtline-blocks are again laſhed to the topmaſt-head, as they were to the lower-maſt-head, and the girtline reeved through, that one part may lead down by the ſide of the maſt, and the other part abaft the top.

BURTON-PENDENTS are hoiſted by the girt-lines, and placed over the topmaſt-head, that the thimbles may hang on each ſide, to hook the burton-tackles in.

SHROUDS are ſwayed and placed over the topmaſt-head; the firſt pair to lead down on the ſtarboard ſide forward, the next pair on the larboard ſide forward; and ſo with the other two pair.

BACK-STAYS are hoiſted and placed over the topmaſt-head; the breaſt back-ſtay firſt, and the ſtanding back-ſtays next.

STAYS are ſwayed and placed over the topmaſt-head; the ſtay firſt, and the preventer-ſtay next.

TOPMAST-CAP is next ſwayed up by the girt-lines into the top, and got upon the topmaſt-head by the men in the top, and beat down firm. The girt-lines are unlaſhed and taken down, and the topmaſt hove up and fidded.

FUTTOCK-PLATES are put through the holes in the edge of the top.

FUTTOCK-SHROUDS are furniſhed with iron hooks, in the upper-ends, that hook to a hole in the lower ends of the futtock-plates; and the lower ends of the futtock-ſhrouds are attached to the lower-ſhrouds, with a round turn round the futtock-ſtaff and ſhroud, and ſeized upon the ſtanding part of the ſhroud with two ſeizings croſſed.

DEAD-EYES are turned into the lower ends of the topmaſt-ſhrouds, as the lower ones are in the lower-ſhrouds.

LANIARDS are reeved through the dead-eye in the ſhrouds and the dead-eye in the futtock-plate, as the lower ones, and ſet up with the top burton-tackles. The topmaſt-ſhrouds are to ſecure the topmaſt, and the futtock-ſhrouds receive equal tenſion by, means of the futtock-plates paſſing through the top and connecting with the futtock-ſhrouds below.

RATLINGS as the lower ſhrouds.

THE BREAST BACK-STAY has a ſingle block turned into the lower end, with a throat and round ſeizing, through which the runner is reeved.

One end is made faſt to the chain-plates, abreaſt the maſt, with a half-hitch, and the end ſeized down. In the other end is ſpliced a double block, connected by its fall to a double block that is ſtrapped with an eye, through which a ſpan is reeved, that has an eye ſpliced in each end, by which it is laſhed to the chain-plates.

AFTER-BACK-STAYS are ſet up, the ſame as a ſhroud, to a ſmall dead-eye in the after end of the channel.

SHIFTING-BACK-STAYS are clenched round the topmaſt-head, and a thimble ſpliced in the lower end, to which is hooked a tackle, the lower block of which is hooked to an eye-bolt without-board, and frequently ſhifted from place to place.

BACK-STAYS are extended to the channels on each ſide, and are to ſupport the topmaſts, and aſſiſt the ſhrouds, when the maſt is ſtrained by a weight of ſail.

STAYS are thus ſet up: The ſhrouds and back-ſtays are firſt caſt off, and the maſt-head got as far forward as nearly to touch the fore-part of the partners, by the runners and tackles or burtons of the mizenmaſt. The fore-pendents are frapped together abaſt the fore-maſt; the runners are paſſed round the bowſprit with a round turn, and hitched with the bight ſeized. The falls of the runner tackles then lead in upon deck through a block laſhed round each knight-head, and ſwayed upon by the people on deck.

MAIN-PENDENTS are frapped together abaft the mainmaſt, and the runners made faſt round the cable-bits, ſimilar to the fore-maſt.

The tackles hook to eye-bolts in the deck, and the falls lead aft.

MIZEN-BURTONS are brought to the fore-brace-bitts, as the runners are to the cable-bitts.

THE FORE-STAY has a heart turned in the lower end with a throat-ſeizing, and two round ſeizings above, and the end of the ſtay capped with canvas, whipped and tarred, then ſet up with a laniard, that reeves alternately through the heart in the ſtay and the heart in the fore-ſtay-collar on the bowſprit. The firſt four turns lie in ſcores cut in the hearts, and are tallowed, that the ſtrain may be immediately given to all the turns at once. The laniard is then ſtrained tight by tackles, thus: The upper block of a luff-tackle is hooked to a ſelvagee faſtened round the ſtay, and the lower block is hooked with a cats-paw to the laniard: then the outer-block of another luff-tackle is hooked with a cats-paw to the fall of the other tackle, and the inner block hooked where moſt convenient. The fall leads in upon deck, and is ſwayed by all hands. Then two of the turns, are ſtopt together with a rope-yarn to prevent their coming up, and more turns taken, and hove on, as before, till the laniard is expended; the end is then well ſtopped.

THE PREVENTER-STAY is ſet up the ſame as the fore-ſtay.

THE MAIN-STAY ſets up, as the fore-ſtay, to a heart ſeized in the bight of the main-ſtay-collar above the bowſprit-chock.

The COLLAR reeves from the ſtarboard-ſide through a large hole in the ſtandard in the head, (or a large triangular eye-bolt is driven through the ſtem in ſome merchant ſhips,) then reeves through the eye in the other end, and is brought down to its ſtanding part, and ſecurely ſeized and croſſed in two or three places, and the end capped; the heart is then ſeized in the bight.

The MAIN-PREVENTER-STAY ſets up, as the fore-ſtay, to a heart ſeized in the bight of the main-preventer-ſtay-collar, which laſhes round the foremaſt, on the fore-ſide through two eyes, or through a large eye-bolt in the head, the ſame as the main-ſtay-collar.

The MIZEN-STAY leads down from the maſt-head through a thimble, ſeized in the collar, laſhed round the mainmaſt twelve feet up from the deck. It has an eye ſpliced in each end, and laſhes in the fore-ſide of the maſt. A thimble is turned in the end of the ſtay, after it is reeved through the collar, and ſet up with a laniard, reeved four or more turns alternately through the thimble in the ſtay, and an eye-bolt in the deck, that is parcelled and ſerved. The laniard is ſet tight by the main-runners, and cats-pawed, as much as is required to ſtay the maſt; two of the turns are then ſtopt together with a rope-yarn, the length of the laniard expended, and the end made faſt with a hitch, and ſeized.

TOPMAST-STAYS.

The FORE-TOP and FORE-TOP-PREVENTER-STAYS ſet up through the bees of the bowſprit, thus: A block with a ſheave in it is fixed under the holes in the bees, on each ſide, through which the ſtay paſſes; then a long tackle-block is turned into the ends, which is connected by its fall to a ſingle block hooked to an eye-bolt in the bow on each ſide, and is ſet up with a luff-tackle, cats-pawed to its fall. The luff-tackle fall leads in upon the forecaſtle, and is ſwayed upon by the men. When the ſtay is ſet up, the parts of the tackle are ſtopt together with a rope-yarn, and the fall of the long-tackle is paſſed through the eye-bolt and arſe of the block alternately, till it is expended. The end is then made faſt, round all the parts, with two half-hitches.

The MAIN-TOPMAST-STAY reeves through a ſingle block, ſtrapped with a long and ſhort leg; the ſhort leg has an eye ſpliced in it, and faſtened round the foremaſt-head above the rigging; the long leg goes round the maſt, and through the eye of the ſhort leg, and is turned back and ſeized. The ſtay, having a thimble turned in the lower end, leads down between the catharpins and the maſt. It ſets up with a laniard to an eye-bolt in the deck, cloſe abaft the maſt, with a luff-tackle hooked to a ſelvagee, faſtened to the ſtay.

The PREVENTER-STAY reeves through a thimble ſeized in the bight of the collar, that laſhes at the fore part of the foremaſt cloſe up to the bibs, through the eyes, ſpliced in the ends of the collar, and then ſets up to an eye-bolt, as the topmaſt-ſtay.

The MIZEN TOPMAST-STAY reeves through a thimble ſeized in the bight of the collar that laſhes at the fore part of the mainmaſt, cloſe up to the bibs; a thimble is then ſpliced in the ends of the ſtay, which ſets up through another thimble (with a laniard) that is ſpliced in another collar, laſhed round the maſt as the former, juſt below the catharpins, with the top-burton-tackle cats-pawed to the laniard. If with a long pole-head, the ſame as a topgallant-maſt.

LOWER-YARDS.

Lower yards are rigged as follow. One end of the hawſer that hove up the topmaſt is made faſt round the yard with a round turn and two half-hitches, ſecurely ſtopt with ſpun-yarn along the yard, in ſeveral places, and well ſtopt at the upper yard-arm. As it is hove on board, the ſtops are cut, and the runner-tackle of the oppoſite ſide is brought on to the quarter of the yard, to lower it eaſy, as

the yard advances aboard beyond the middle or ſlings. The yards are placed ſquare athwartſhips, before their reſpective maſts. The fore-yard muſt be kept above the main-ſtay by the runners, which are made faſt round each outer quarter of the yard.

HORSES go over the yard-arms with an eye in their outer ends, and ſtop againſt the cleats, and hang about three feet below the yard. To keep the horſe more parallel to the yard, it is ſuſpended, at proper diſtances, by ropes, called ſtirrups, that have thimbles or eyes ſpliced in their lower ends, through which the horſes paſs; they are four on each ſide, and hang three feet below the yard, and the upper ends are opened, plaited, and faſtened to the yard with three round turns and nails. The inner ends of the horſes have a thimble turned in, with a throat and round ſeizing; they laſh to the yard, on the oppoſite ſide of the cleats, with a laniard that paſſes round the yard and through the thimble.

YARD-TACKLE-PENDENTS are next put over the yard-arm, with an eye, as the former. In the lower end is ſpliced a double block, connected by its fall to a ſingle one, ſtrapped with a hook and thimble, to hoiſt in the boats, &c.

TRICING-BLOCKS, for the yard-tackles, are ſtrapped with a ſhort laſhing-eye, that ſeizes round the yard about one-third the length within the arm-cleats. The blocks to hang under the yard.

THE INNER-TRICING-LINE reeves through a block laſhed to the futtock-ſtaff; has a long eye ſpliced in the outer end, that reeves through the hook of the ſingle block; the bight is put over the hook with a couple of turns, and the leading part belays to the ſhrouds. At ſea, the hook is hooked to a becket. or ſtrap, round the futtock-ſtaff.

THE OUTER-TRICING-LINE is ſpliced round the ſtrap of the yard-tackle-block, and reeved through a block on the yard, then leads into the ſhrouds, and reeves through a block laſhed to the ſhrouds, near the futtock-ſtaff, and down upon deck.

BRACE-PENDENTS are next put over the yard-arms with an eye, as above; in the lower end is a ſingle block, through which the brace reeves. Sometimes, in the navy, and oftener in the merchant-ſervice the block is laſhed to the yard-arm without a pendent.

FORE-BRACES reeve through the pendent-block; the ſtanding parts make faſt round the collar of the main ſtay, on each ſide, with a hitch, and the end ſeized. The leading part reeves through a ſingle block, laſhed on each ſide the main-ſtay-collar, cloſe up to the rigging, then leads down, and paſſes through a ſheave-hole in the bitts, at the fore part of the quarter-deck, and there belays. Brigs lead the ſame.

MAIN-BRACES reeve through a ſingle block in the pendent; the ſtanding part makes faſt with a clench round an eye-bolt in the upper part of the quarter-piece; the leading part reeves through a ſnatch-block cloſe aft upon the gunwale, and belays round a cleat on the inſide.

SPAN FOR MAIN-BRACES has two legs, with a thimble ſpliced in the end of each leg, which reeves the ſtanding and leading part of the brace, and the ſpan makes faſt with a half-hitch, and the end ſeized up round the mizen-ſhrouds.

PREVENTER-BRACES, in war, are reeved through a block laſhed round the yard-arm, and reeve through a block in a ſpan, round the bowſprit-cap; they then lead in upon the fore-caſtle, and the ſtanding parts make faſt round the cap. The main-brace reeves through the block on the yard-arm, then through a block laſhed to the fore-ſhrouds, cloſe below the catharpins; they then

lead down upon the fore-caſtle, and the ſtanding-part makes faſt to the ſhrouds above the block with a hitch, and the end ſeized. Brigs reeve the ſame.

TOPSAIL-SHEET-BLOCKS are next put over the yard-arms, ſtrapt with an eye the ſize of the yard-arm.

LIFT-BLOCKS are next ſpliced into the ſtrap of the topſail-ſheet-blocks: the lifts reeve through the block in the ſpan round the maſt-head, between that and the topmaſt, then lead down abreaſt the ſhrouds, and reeve through a block faſtened to the ſide, and are there belayed.

JEARS, in large ſhips, are two large tackles. The hanging blocks at the maſt-head are hove up cloſe on each ſide, by the top-burton-tackles, and laſhed. A broad elm cleat is nailed on each ſide the maſt-head, above the blocks, as a ſtop for the laſhing. Every turn of laſhing is alternately paſſed through the ſtrap of the block, and over the cleat on the oppoſite ſide, and the ends of the laſhing are well ſtopt. The other two blocks are ſtrapt with a double ſtrap to the ſize of the yard, with a long and a ſhort leg. They laſh on each ſide of the middle or ſlings, within the cleats. The long leg of the ſtrap goes down the aftſide of the yard, and meets the bight of the ſhort leg on the foreſide, and laſhes, every turn paſſing alternately through each bight, roſe faſhion. The blocks, at the maſt-head and on the yard, are connected by their falls, which lead upon deck.

JEARS, in merchant-ſhips, and ſmall ſhips in the navy, have two ſingle blocks laſhed on each ſide the maſt-head, as above, and another, the ſame ſize, in the middle of the yard. The tye, which connects with theſe blocks, reeves through one of the blocks at the maſt-head, then through the block on the yard, and afterwards through the block on the other ſide the maſt-head. In the lower ends of the tye is ſpliced a double-block, which is connected by its fall to a treble-block, that hooks to an eye-bolt in the deck, cloſe to the maſt, on each ſide. By this the power of the tackles below is communicated to the tye, which, connecting with the block upon the yard, eaſily ſways it up, or lowers it down.

QUARTER-BLOCKS are ſtrapt with a long and ſhort leg, with a laſhing-eye ſpliced in the ends, and laſh to the yard within the cleats, in the middle of the yard, the block hanging downwards. The long leg comes up the aftſide, and meets the ſhort leg on the foreſide, and there laſhes through the eyes. Through theſe blocks reeve the topſail ſheets and clue-lines.

A quarter-block is a double-block, with a thick and thin ſheave running on the ſame pin; and, though uſed for the topſail ſheets, and intended for the clue-lines, a ſingle block would be cheaper and better, as the thin ſheave is ſeldom uſed for the clue-line, it being found to impede rather than facilitate. Small ſhips, in the merchant-ſervice, have a double-block laſhed in the middle of the yard, as the quarter-block, through which the ſheets reeve, and lead down on oppoſite ſides. Large ſhips, in the merchant-ſervice, have a ſingle-block laſhed on each ſide the middle of the yard, and the ſheets reeve on their reſpective ſides, and lead down by the maſt.

CLUE-GARNET-BLOCKS laſh through the eyes upon the yard, the blocks hanging underneath, four feet without the middle-cleats on each ſide.

LEECH-LINE-BLOCKS are laſhed round the yard and through the eye of the ſtrap, ten feet within the cleats on each yard-arm. The blocks to hang on the fore part of the yard.

BUNTLINE-BLOCKS are laſhed as the former in the middle, between them and the ſlings of the yard.

SLAB-LINE-BLOCKS are ſtrapt with a ſhort laſhing-eye, that ſeizes to the ſpan of the quarter-blocks underneath the yard.

TRUSS-PENDENTS; the ends that have the thimbles in are paſſed round the yard within the cleats on each ſide the middle or ſlings, and are well ſeized. One end paſſes over the yard, the other under, and both ends round the maſt. The ſtarboard end reeves through the larboard thimble, and the larboard end through the ſtarboard thimble. In the lower end is a double-block turned in, with a throat and round ſeizing, connected by its fall to a double-block, that hooks to an eye-bolt in the deck, on each ſide the maſt, by which the truſs-pendent is ſlackened or ſtraightened, to let the yard move from, or confine it ſtrictly to, the maſt.

NAVE-LINE reeves through a ſingle block, laſhed under the aftſide of the top, and through a block or thimble ſeized to the truſs-pendents, up again, and makes faſt round the treſtle-trees. The leading-part goes down upon deck.

SLINGS AND STRAPS. The long leg of the ſtrap paſſes down the aftſide of the yard, comes up the foreſide, meets the ſhort leg, and laſhes through the eyes, the ſtrap being placed exactly in the middle of the yard, and the thimble upwards.

SLINGS have a long and ſhort leg, and a large thimble ſeized in the bight. The long leg paſſes round the after-part of the maſt, and reeves through the eye in the ſhort leg; it is then brought back, and ſecurely ſeized to its own part in ſeveral places. By theſe the yard is retained at the maſt-head with a laniard, that ſplices in the thimbles in the ſlings, at the fore part of the maſt, and then reeves through the thimble in the ſtrap upon the yard, and ſo alternately till the laniard is expended. The end then fraps round the turns, and makes faſt with two half hitches. In time of action, the yards are ſlung with chains.

TOPSAIL-YARDS.

THE TOP ROPE is faſtened to the ſlings of the yard, and ſtopt from thence to the yard-arm, by which it is hove on-board, and placed for rigging as follows.

Firſt, the HORSES are the ſame as the lower yards, the addition of flemiſh-horſes excepted, (the lower yards having none.) They have an eye ſpliced in each end; one eye is put over the eye-bolt in the yard-arm, and the other eye is ſeized round the yard within the arm-cleats.

BRACE-PENDENTS are next put over the yard, as on the lower ones. The fore-topſail-braces reeve through the block in the pendent, and then through a block laſhed on each ſide the collar on the main-ſtay, a little below the fore-braces; the ſtanding-part makes faſt to the ſtay below the block with a hitch, and ſeized. The leading-part leads from the block upon the collar of the ſtay through a block laſhed on the ſtay abreaſt the fore hatchway, and through a block ſtrapt with a thimble into an eye-bolt in the aft-part of the forecaſtle, and belays round an iron pin in the boat-ſkid.

MAIN-TOPSAIL-BRACES reeve through the block in the pendent, and the ſtanding-part makes faſt to the collar of the mizen-ſtay. The leading-part reeves through a block in the ſpan round the mizen-maſt-head below the hounds, and leads down through a ſheave-hole in the mizen-topſail-ſheet-bitts, abaft the mizen-maſt, and belays there.

MIZEN-TOPSAIL-BRACES reeve through the block in the pendent. The ſtanding-part makes faſt round the peek-end, and the leading-part reeves through ſingle blocks at the peek, and comes down to the fore-ſide of the taffarel.

LIFT-BLOCKS are ſtrapt with an eye to the ſize of the yard-arm. The lift reeves through the lower ſheave in the ſiſter-block in the topmaſt-ſhrouds, and through the block on the yard-arm. The ſtanding-part hooks to a becket round the topmaſt-cap, and the leading-part leads down the ſide of the maſt, and belays to the dead-eyes in the lower ſhrouds.

REEF-TACKLE-PENDENTS reeve through the upper ſheave in the ſiſter-block in the topmaſt-ſhrouds, thence through the ſheave-hole in the yard-arm, and are ſtopt with an overhand-knot, till the ſail is bent. In the lower ends of the pendents a double-block is turned in, connected by its fall to another double-block, that is ſeized to the after part of the lower treſtle-trees, and the ends of the falls lead down upon deck.

TYE-BLOCKS laſh at the topmaſt-head cloſe up to the rigging, under the collar of the ſtay, as the lower ones; and the blocks on the yards laſh under the fore part of the yard, as the lower ones, and reeve with a double tye, in large ſhips, and a ſingle tye, like the lower, in ſmall ones. The ſtanding-parts of the double-tyes clinch round the maſt-head, then reeve through the double-block upon the yard, and up again, and reeve through the block on each ſide the maſt-head. The fly-blocks are then ſpliced in their lower ends, and connected by their haliards to a ſingle-block, that is ſtrapt with a long ſtrap, with a hook and thimble, that hooks to a ſwivel-eye-bolt in the channel on each ſide: the leading-part comes in through a block laſhed on each ſide; the foremoſt ones abaft the forecaſtle, and the after ones on the quarter-deck.

THE PARRAL is faſtened round the aftſide of the maſt, and round the yard, to faſten the yard to the maſt. The upper and lower rope in the parral have an eye ſpliced in the end, one eye paſſing under the yard, the other over, till both eyes meet on the foreſide, and are ſeized together with ſpun-yarn. The other two ends of the parral-rope are paſſed round the yard and the hind part of the parral, alternately, till the latter is ſufficiently ſecured to the former; and the whole of the turns are marled together with quarter-ſeizings, to confine them cloſe in the cavity formed on the back of the ribs.

CLUE-LINE-BLOCKS are ſtrapt with two laſhing-eyes, and laſh upon the yard three feet without the ſlings; the blocks hanging underneath the yard, through which the clue-line reeves, and is ſtrapt with a knot, and leads down upon the deck.

TOPGALLANT-SHEET-BLOCKS are ſtrapt with two laſhing-eyes, and laſh upon the yard, cloſe within the clue-line-blocks on each ſide.

BUNTLINE-BLOCKS are ſpliced round the ſtrap of the topſail-tye-block upon the yard.

TOPGALLANT-MASTS.

THE TOP-ROPE reeves for the topgallant-maſt as it does for the topmaſts, obſerving to ſtop it to the topgallant-maſt-head with ſpun-yarn, to keep it ſteady, till it has entered the topmaſt-cap. The ſtop is then cut, and the end of the top-rope made faſt to the eye-bolt in the topmaſt-cap. Sometimes it is rigged abaft the maſt.

THE GROMMET, made of a rope ſpliced to the ſize of the maſt, is firſt put over the head, and then beat down to the ſtop of the hounds.

SHROUDS are hoiſted, and placed over the topgallant-maſt-head, the ſame as the topmaſt.

BACKSTAYS are next hoiſted, and placed over the topgallant-maſt-head, the ſame as the topmaſts.

THE STAY is hoiſted and placed over all, and then the topgallant-maſt is ſwayed up and fidded.

SHROUDS are thruſt through the hole in the end of the topmaſt-croſs-trees, and between the topmaſt-ſhrouds, over the futtock-ſtave. A thimble is ſeized in the ends that ſets up with a laniard through a thimble ſeized in the bight of a ſtrap made faſt round the futtock-plates, cloſe under the dead-eyes, with a turn through the bight.

BACKSTAYS ſet up, the ſame as the topmaſt-backſtays, to a ſmall dead-eye in the aft-part of the channel, or in a ſtool abaft the channel.

THE FORE-TOPGALLANT-STAY comes to the outer end of the jib-boom, and reeves through a thimble; then a thimble is turned in the end, and ſeized to a block, and ſet up with a jigger-tackle occaſionally, and ſecured, by a laniard, to the gammoning, or to an eye-bolt in the head.

THE MAIN-TOPGALLANT-STAY reeves through a block faſtened to the fore-topmaſt-head, has a thimble turned in the end of the ſtay, and ſets up to a thimble in a ſpan, made faſt to the treſtle-trees of the fore-maſt, with a laniard cats-pawed to the top-burton-tackle, or a handſpec: in ſmall ſhips, termed a Spaniſh-windlaſs.

THE STAYSAIL-STAY is ſpliced into the topgallant-ſtay, ſix feet below the ſtop of the maſt; it then reeves through a block or thimble ſecured to the fore-topmaſt-head, takes a turn round the treſtle-trees, and belays there.

THE MIZEN-TOPGALLANT-STAY trices up to the main-topmaſt-head, as the main-topgallant-ſtay trices up to the fore-topmaſt-head.

THE FLAGSTAFF-STAY goes round the topgallant or royal maſt-head with a running eye; is kept cloſe under the truck, by a ſmall cleat nailed on each ſide, and ſets up by hand. The foremoſt one paſſes through a thimble at the jib-boom end, and belays round the fore-ſtay-collar; the main one paſſes through a thimble above the fore-topgallant rigging, and belays in the top. Mizen one the ſame to main-topgallant rigging.

ROYAL-MASTS, in Eaſt-India ſhips, are rigged as topgallant maſts, and generally abaft the maſt.

THE TOPGALLANT-YARDS

Are hove on-board by the top-rope, as the topſail-yards, and rig with horſes, braces, and lifts, over the yard-arm, the ſame as the topſail-yards.

THE TYE reeves through the ſheave-hole in the hounds of the topgallant-maſt, and clinches round the yard in the ſlings or middle; then has a double-block turned in the lower end, and is connected, by the haliards, to a ſingle-block laſhed to the after-part of the lower treſtle-trees, under the top: the lower end of the haliards belays round the croſs-piece of the bits abaft the maſt.

PARRAL, as the topſail-yard.

FORE-TOPGALLANT-BRACES reeve through the block in the pendent. The ſtanding-part makes faſt with a hitch, and the end ſeized back round the collar of the main-topmaſt-ſtay on each ſide; and the leading-part reeves through a block laſhed round the collar, a little below the ſtanding-part; then leads through a block at the aft-part of the fore-top, and belays to a cleat on each ſide the bellfry.

MAIN-TOPGALLANT-BRACES reeve through the block in the pendent, and the ſtanding and leading parts make faſt, and reeve to the collar of the mizen-topmaſt-ſtay, as the former does to the main-topmaſt-ſtay, and lead down into the mizen-ſhrouds.

MIZEN-TOPGALLANT-BRACES are ſingle, and go with a ſplice over the yard-arm. They lead aft through a thimble at the mizen-peek, and come down on the fore-ſide of the taffarel.

CLUE-LINE-BLOCKS are ſtrapt with two laſhing-eyes, and laſh upon the yard three feet without the ſlings. The blocks hang under the yard, through which is reeved the clue-line, which is ſtopt with a knot. The leading-part leads down the maſt, and into the lower ſhrouds.

TOPGALLANT-LIFTS are ſingle, and go over the yard-arm with an eye ſpliced in one end; the other end reeves through a thimble in the topgallant-ſhrouds, leads down into the top, and belays round the dead-eyes.

THE CROSS-JACK-YARD

Is hove on-board the ſame as the other yards, and rigged as follows:

The HORSES, BRACES, LIFTS, and TOPSAIL-SHEET-BLOCKS, go over the yard-arm the ſame as on the other lower yards.

A QUARTER-BLOCK is ſtrapt with a double ſtrap, with an eye in each of the four ends, and is laſhed upon the yard in the middle, between the cleats.

SLINGS AND STRAPS, as the lower yards of the fore and main maſts.

BRACE-PENDENTS are ſtopt to the yard about four feet within the cleats at the yard-arm; the brace then reeves through the block in the pendent. The ſtanding-part of the ſtarboard brace makes faſt to one of the middle ſhrouds on the larboard ſide with a hitch, and the end ſtopt; and the leading-part reeves down through a ſingle-block laſhed to the ſame ſhroud a little below the catharpins; it then leads through a truck or double-block ſeized to the middle ſhroud, and belays round a pin in the fife-rail, and the larboard braces the contrary.

LIFTS, RUNNING. Running-lifts reeve through a block in a ſpan round the mizen-cap, and through the block upon the yard. The ſtanding-part is carried up, and makes faſt round the cap, and the leading-part leads upon deck.

LIFTS, SINGLE, are ſpliced through the ſtrap of the topſail-ſheet-block, and the other end is carried up, then hitched and ſeized to an eye-bolt on each ſide the mizen-cap.

THE MIZEN-YARD

Is not often uſed, except in ſhips above 50 guns, and in Eaſt-India ſhips. It is hove on-board as before obſerved, and rigs with a jeer-block laſhed between the cleats, as before, and likewiſe a double-block round the maſt-head, and both are connected by the jeer-fall. The ſtanding-part is clinched round the maſt-head, and the leading-part comes to the mizen-chains; and, after the yard is ſwayed up, is made faſt to an eye-bolt hitched and ſeized. The remainder of the fall is coiled up, and ſtops to the laniards of the ſhrouds on the ſtarboard-ſide.

THE DERRICK-BLOCK is ſtrapt with eyes, that go round the yard and laſh underneath, between the ſlings and the outer yard-arm or peek; the other block is croſs-ſeized into the ſtrap, has an eye ſpliced in each end, and lies upon the mizen-cap, and ſeizes or hangs through the eyes under the cap, or upon the upper ſide of it.

THE DERRICK-FALL reeves through the double-block at the maſt-head, then through the ſingle-block upon the yard. The ſtanding-part is again taken up and reeved through the block at the mizen-cap; an eye is then ſpliced in the end, the ſize of the yard-arm, that goes over the peek-end. The leading-part leads from the double-block at the cap through the treſtle-trees, and makes faſt in the mizen-channel on the larboard-ſide, as the jeers did on the ſtarboard-ſide.

BRAIL-BLOCKS are ſtrapt together in one ſtrap, and lie over the yard, and ſeize together underneath; the throat-blocks next the cleats to the maſt; the middle-blocks in the middle between the throat-block and peek; the peek-blocks about three or four feet within the cleats at the peek.

VANGS. The bight is put over the peek-end with an overhand-knot, and the double-blocks ſpliced in the lower ends are connected by their falls to a ſingleblock, that hooks to an eye-bolt in the upper

part of the quarter-piece on each ſide. The ſtanding-part makes faſt to the becket in the arſe of the ſingle-block, and the leading-part leads from the double-block, and belays to a cleat nailed on the taffarel fife-rail, or round the arſe of the ſingle-block.

BOWLINES reeve through a ſingle-block ſtrapt with a thimble into an eye-bolt in the lower end of the yard, and through a block hooked to an eye-bolt on each ſide abreaſt the lower end of the yard, or laſhed to the mizen-ſhrouds.

THE HORSE for the mizen-ſheets clinches to an eye-blot on each ſide the taffarel with a thimble, to which is ſtrapt the ſheet-block.

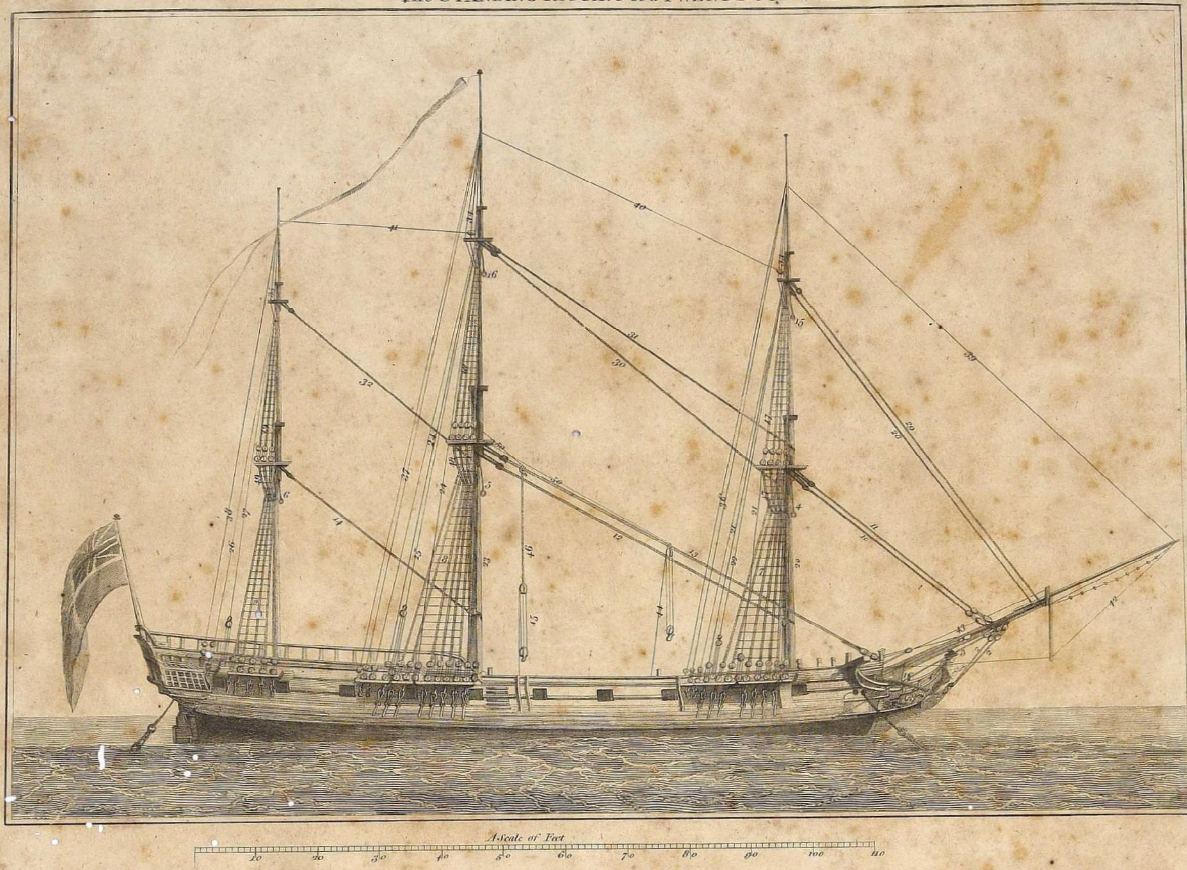
DRIVER OR SPANKER-BOOM.

THE TOPPING-LIFT goes over the end of the boom with a clove-hitch, and comes againſt the ſhoulder; the ends are reeved through a ſingle-block laſhed on each ſide the mizen-maſt-head, and a double-block ſpliced in each lower end, which connects by the fall to a ſingle-block, hooked in an eye-bolt in the mizen-channel on each ſide. The ſtanding-part makes faſt to the becket in the arſe of the ſingle-block, and the leading-part leads from the double-block, and belays to a cleat on each ſide the mizen-maſt.

GUY-PENDENTS have a hook and thimble ſpliced in one end, that hooks to the thimbles ſeized in the ſtrap. They are ſpliced round the boom perpendicular to the lower block fixed round the horſe within the taffarel; and there ſtopt by cleats nailed on the foreſide. A thimble is ſpliced in the inner ends of the pendents, with a luff-tackle hooked in them on each ſide, and are uſed where moſt wanted.

SHROUDS are ſet up for ſea after the ſtays, as before; as are alſo the topmaſt-ſhrouds and back-ſtays.

The STANDING RIGGING of a TWENTY GUN SHIP.



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EXPLANATION OF THE REFERENCES ON THE PLATE DELINEATING THE STANDING RIGGING OF A TWENTY GUN SHIP.

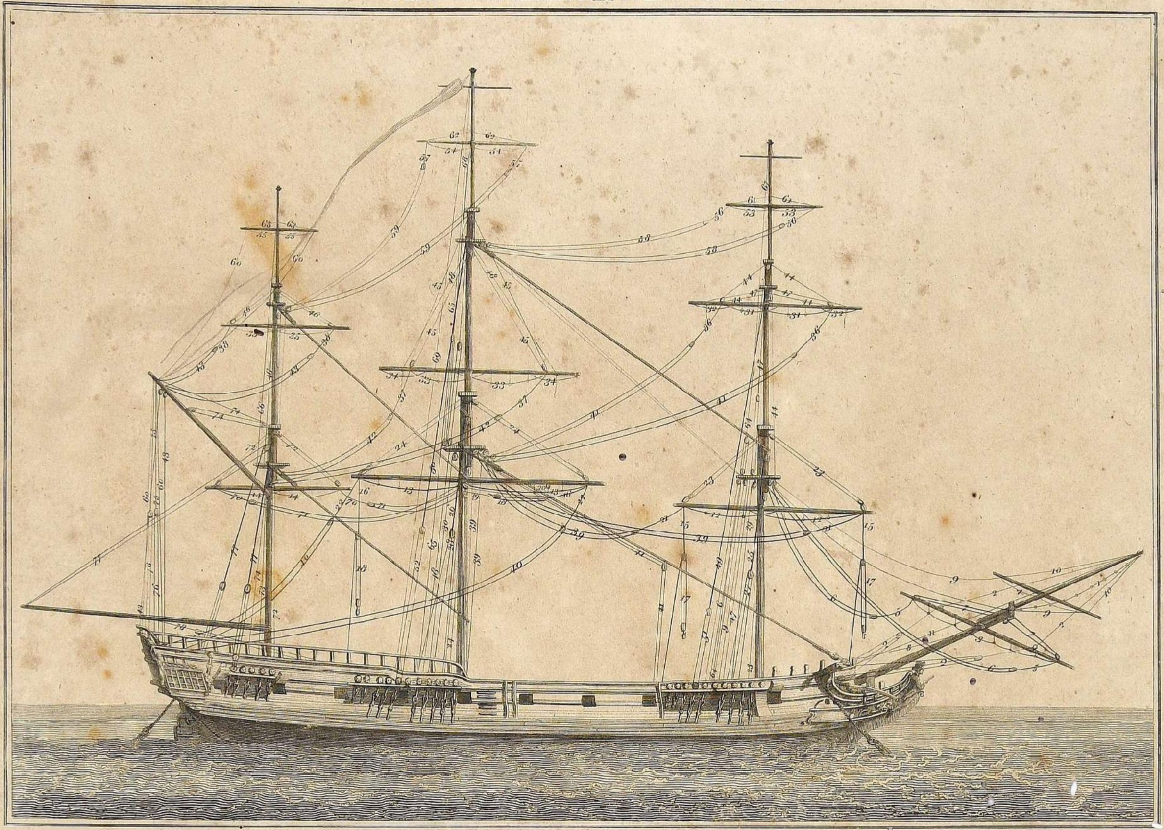
1 Gammoning.
2 Bobſtays.
3 Bowſprit ſhrouds.
4 Fore tackle pendents.
5 Main tackle pendents.
6 Mizen burton pendents.
7 Fore ſhrouds.
8 Main ſhrouds.
9 Mizen ſhrouds.
10 Fore preventer ſtay.
11 Fore ſtay.
12 Main preventer ſtay.
13 Main ſtay.
14 Mizen ſtay.
15 Fore topmaſt burton pendents.
16 Main topmaſt burton pendents.
17 Fore topmaſt ſhrouds.
18 Main topmaſt ſhrouds.
19 Mizen topmaſt ſhrouds.
20 Fore topmaſt breaſt backſtay.
21 Fore topmaſt ſtanding backſtay.
22 Fore topmaſt ſhifting backſtay.
23 Main topmaſt breaſt backſtay.
24 ———— ſtanding backſtay.
25 ———— ſhifting backſtay.
26 Mizen topmaſt ſtanding backſtay.
27 ———— ſhifting backſtay.
28 Foretopmaſt preventer ſtay.
29 ———— ſtay.
30 Main topmaſt preventer ſtay.
31 ———— ſtay.
32 Mizen topmaſt ſtay.
33 Fore topgallant ſhrouds.
34 Main topgallant ſhrouds.
35 Mizen topgallant ſhrouds.
36 Fore topgallant ſtanding backſtays.
37 Main topgallant ſtanding backſtays.
38 Mizen topgallant ſtanding backſtay.
39 Fore topgallant ſtay.
40 Main topgallant ſtay.
41 Mizen topgallant ſtay.
42 Martingal ſtay.
43 Bowſprit horſe.
44 Fore ſtay tackle.
45 Main ſtay tackle.
46 Main ſtay tackle pendent.
47 Fore futtock ſhrouds.
48 Main futtock ſhrouds.
49 Mizen futtock ſhrouds.
50 Stay tackle tricing lines.

TO prevent confuſion of appearance in the plate of ſtanding rigging, the ſhrouds and backſtays are repreſented only on the ſtarboard ſide; but it muſt be remembered, that an equal number of them belong to the larboard ſide. In ſhips, from twenty guns downwards, the preventer ſtays are ſometimes placed under the ſtays; and to them the ſtayſails are bent.

EXPLANATION OF THE REFERENCES ON THE PLATE DELINEATING THE RUNNING RIGGING OF A TWENTY GUN SHIP.

1 Jib horfes.
2 Jib guy pendents and falls.
3 Spritfail yard horfes and ftirrups.
4 ——— topfail yard horfes.
5 ——— brace pendents.
6 ——— braces
7 ——— lifts.
8 ——— haliards
9 Spritfail topfail braces.
10 ———— lifts.
11 ———— haliards.
12 Fore yard horfes and ftirrups.
13 Main yard horfes and ftirrups.
14 Crofs jack horfes.
15 Fore yard tackle pendents.
16 Main yard tackle pendents.
17 Fore yard tackles.
18 Main yard tackle pendents.
19 Inner tricing line to the main yard tackle.
20 Outer tricing line to the main yard tackle.
21 Fore brace pendents.
22 Main brace pendents.
23 Fore lifts.
24 Main lifts.
25 Tye of the fore jeers.
26 ——— main jeers.
27 Fall of the fore jeers.
28 ——— main jeers.
29 Nave line of the fore trufs pendents.
30 ———— main trufs pendents.
31 Fore topfail yard horfes and ftirrups.
32 ———— flemifh horfes.
33 Main topfail yard horfes and ftirrup.
34 ———— flemifh horfes.
35 Mizen topfail horfes.
36 Fore topfail brace pendents.
37 Main topfail brace pendents.
38 Mizen topfail brace pendents.
39 Fore braces.
40 Main braces.
41 Fore topfail braces.
42 Main topfail braces.
43 Mizen topfail braces.
44 Fore topfail lifts.
45 Main topfail lifts.
46 Mizen topfail lifts.
47 Fore topfail reef tackle pendents.
48 Main topfail reef tackle pendents.
49 Fore topfail tye.
50 Main topfail tye.
51 Fore topfail haliards.
52 Main topfail haliards.
53 Fore topgallant yard horfes.
54 Main topgallant yard horfes.
55 Mizen topgallant yard horfes.
56 Fore topgallant brace pendents.
57 Main topgallant brace pendents.
58 Fore topgallant braces.
59 Main topgallant braces.
60 Mizen topgallant braces.
61 Fore topgallant lifts.
62 Main topgallant lifts.
63 Mizen togallant lifts.
64 Fore topgallant haliards.
65 Main topgallant haliards.
66 Mizen topgallant haliards.
67 Fore royal haliard.
68 Main royal haliard.
69 Pendent haliard.
70 Crofs jack brace pendents.
71 ——— braces.
72 ——— lifts.
73 Gaff throat haliards.
74 Gaff peck haliards.
75 Vang pendents.
76 Vang falls.
77 Boom topping lift.
78 Guy pendent and tackle.

The RUNNING RIGGING of a TWENTY GUN SHIP.

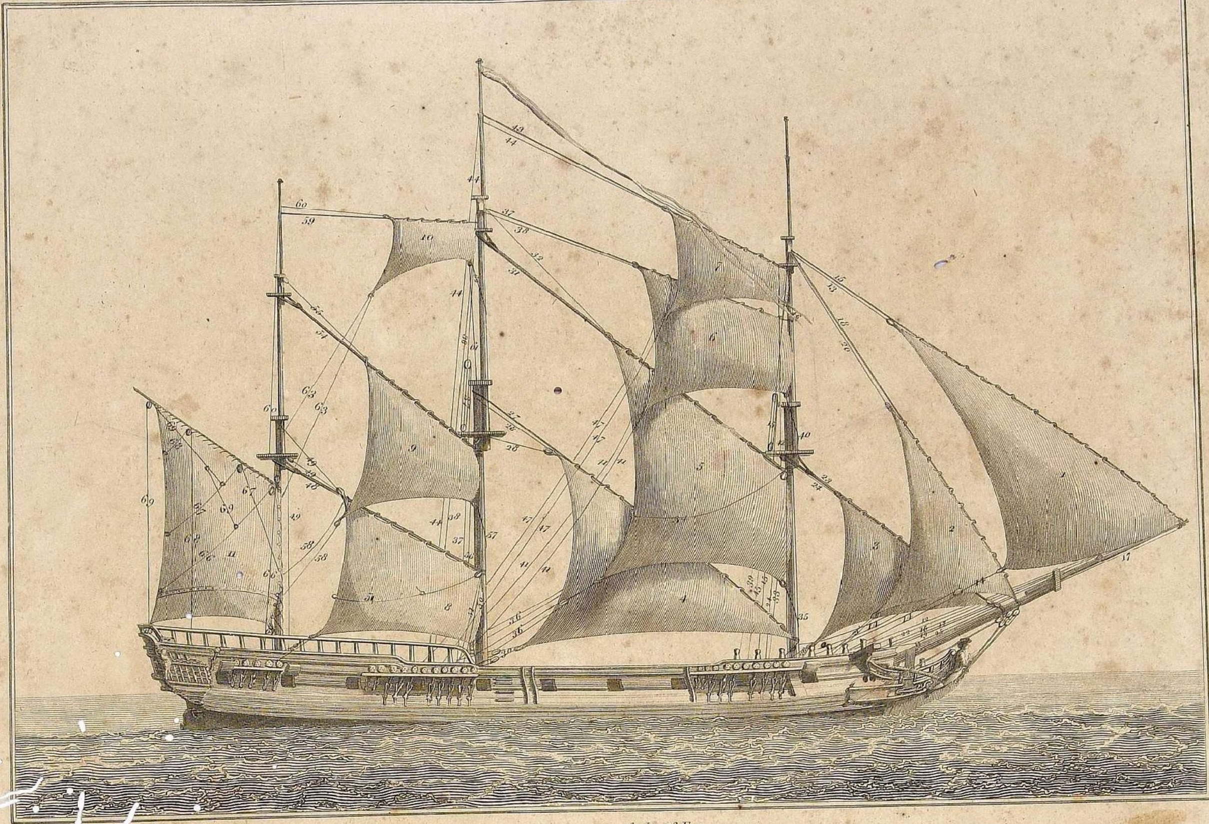


A Scale of Feet

10 20 30 40 50 60 70 80 90 100 110

Published as the Act directs, by D. Steel 1st August, 1794

The FORE-and-AFT SAILS of a TWENTY-GUN-SHIP.



Scale of Feet

10 20 30 40 50 60 70 80 90 100 110

Published as the Act directs, by D. Steel 1st Sepr. 1794.

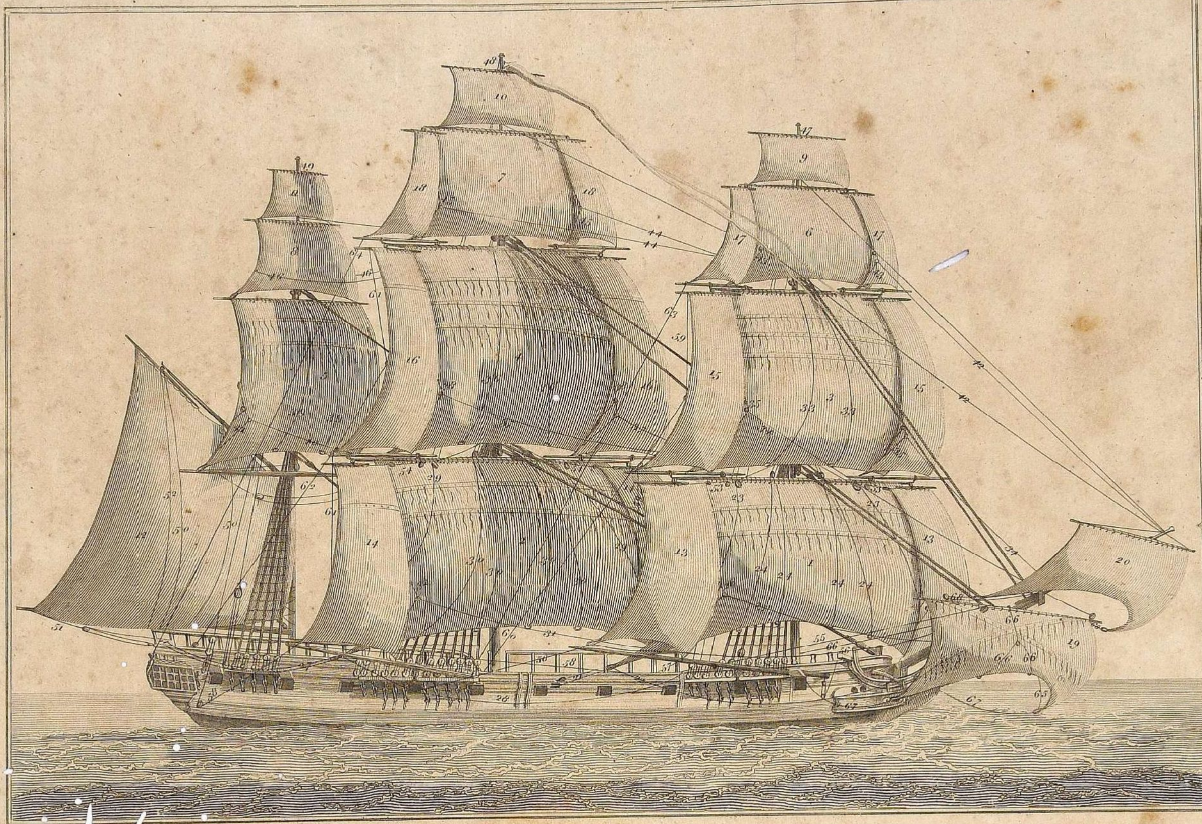
EXPLANATION OF THE REFERENCES ON THE PLATE DELINEATING THE FORE-AND-AFT SAILS OF A TWENTY GUN SHIP.

1 Jib.
2 Fore topmaſt ſtayſail.
3 Fore ſtayſail.
4 Main ſtayſail.
5 Main topmaſt ſtayſail.
6 Middle ſtayſail.
7 Main topgallant ſtayſail.
8 Mizen ſtayſail.
9 Mizen topmaſt ſtayſail.
10 Mizen topgallant ſtayſail.
11 Mizen.
12 Jib downhauler.
13 — haliards.
14 — ſheets.
15 — ſtay.
16 — outhauler.
17 — inhauler.
18 Fore topmaſt ſtay.
19 Fore topmaſt ſtayſail downhauler.
20 ——————— haliards.
21 ——————— ſheets.
22 ——————— outhauler.
23 Fore preventer ſtay.
24 Fore ſtayſail haliards.
25 ———— downhauler.
26 ———— ſheets.
27 Main ſtayſail ſtay.
28 ———— haliards.
29 ———— downhauler.
30 ———— ſheets.
31 Main topmaſt preventer ſtay.
32 ———— ſtayſail haliards.
33 ———————— down hauler.
34 ———————— brails.
35 ———————— tacks.
36 Main topmaſt ſtayſail ſheets.
37 Middle ſtayſail ſtay.
38 ————— haliards.
39 ————— down hauler.
40 ————— tacks.
41 ————— ſheets.
42 ————— tricing line.
43 Main topgallant ſtayſail ſtay.
44 ———————— haliards.
45 ———————— down hauler.
46 ———————— tacks.
47 ———————— ſheets.
48 Mizen ſtay.
49 —— ſtayſail haliards.
50 ————— down hauler.
51 ————— brails.
52 ————— tacks.
53 ————— ſheets.
54 Mizen topmaſt ſtay.
55 ————— ſtayſail haliards.
56 ——————— down hauler.
57 ——————— tacks.
58 ——————— ſheets.
59 Mizen topgallant ſtay.
60 —————— ſtayſail haliards.
61 ———————— down hauler.
62 ———————— tacks.
63 ———————— ſheets.
64 Tack of the mizen courſe.
65 Sheet of the mizen courſe.
66 Throat brails }
67 Middle brails } of the mizen courſe.
68 Peek brails }
69 Fancy line.

EXPLANATION OF THE REFERENCES ON THE PLATE DELINEATING THE SQUARE SAILS OF A TWENTY GUN SHIP.

1 Fore courfe.
2 Main courfe.
3 Fore topfail.
4 Main topfail.
5 Mizen topfail.
6 Fore topgallant fail.
7 Main topgallant fail.
8 Mizen topgallant fail.
9 Fore royal.
10 Main royal.
11 Mizen royal.
12 Driver.
13 Fore ftudding fails.
14 Main ftudding fails.
15 Fore topmaft ftudding fails.
16 Main topmaft ftudding fails.
17 Fore topgallant ftudding fails.
18 Main topgallant ftudding fails.
19 Spritfail courfe.
20 Spritfail topfail.
21 Fore fail fheets.
22 ——— tacks.
23 ——— leech lines.
24 ——— buntlines.
25 ——— bowlines.
26 ——— bowline bridles.
27 Main fheets.
28 —— tack.
29 Mail fail leech lines.
30 ——— buntlines.
31 ——— bowlines.
32 ——— bowline bridles.
33 Fore topfail buntlines.
34 ——— bowlines.
35 Fore topfail bowline bridles.
36 Main topfail buntlines.
37 ——— bowlines.
38 ——— bowline bridles.
39 Mizen topfail buntlines.
40 ——— bowline.
41 ——— bowline bridles.
42 Fore topgallant bowlines.
43 ——— bowline bridles.
44 Main topgallant bowlines.
45 ——— bowline bridles.
46 Mizen topgallant bowline.
47 Fore royal haliards.
48 Main royal haliards.
49 Mizen royal haliards.
50 Driver haliards.
51 ——— fheet.
52 ——— down hauler.
53 Fore ftudding fail inner haliards.
54 Main ftudding fail inner haliards.
55 Fore ftudding fail boom guy.
56 ——— tacks.
57 ——— fheets.
58 Main ftudding fail tacks.
59 Fore topmaft ftudding fail down hauler.
60 ——— tack.
61 Main topmaft ftudding fail downhauler.
62 ——— tack.
63 Fore topgallant ftudding fail tack.
64 Main topgallant ftudding fail tack.
65 Spritfail clue line.
66 ——— buntline.
67 ——— fheets.
68 ——— topfail fheets.

The SQUARE SAILS and DRIVER of a TWENTY-GUN-SHIP.



Scale of Feet

10 20 30 40 50 60 70 80 90 100 110

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SAILS.

JIB.

THE DOWNHAULER reeves through a ſmall block that laſhes to the traveller on the jib-boom, then leads up through the hanks, and bends to the head of the jib. The leading-part leads in upon the forecaſtle.

THE HALIARDS reeve through the lower ſheave of the cheek-block at the fore-topmaſt-head, from aft on the ſtarboard-ſide, and bend to the head of the ſail. The leading-part leads abaft the top to the after-part of the forecaſtle.

Large ſhips have a ſingle-block turned into the haliards, and a whip-fall; the ſtanding-part making faſt into the ſide.

SHEETS. The bight is bent to the clue of the ſail, and a ſingle-block turned in each inner end, that reeves a whip-fall. The ſtanding-part makes faſt to a timber-head, and the leading-part leads in upon the forecaſtle, and belays to a timber-head before the ſhrouds on each ſide.

STAY reeves through the ſheeve in the cheek-block at the fore-topmaſt-head from aft on the ſtarboard-ſide, then through the hanks, and clinches to the traveller upon the boom: a double-block is then turned in the lower end, and connects by its fall to a ſingle-block, laſhed to the after part of the foremaſt treſtle-trees, leads upon deck, and belays to the main-top-bowline bitts.

OUTHAULER reeves through a ſheave-hole at the outer end of the jib-boom; and clinches to the ſpan-tackle of the traveller. The other end has a double-block turned in, which connects, with its fall, a ſingle-block hooked to an eye-bolt in the fore part of the bowſprit-cap, and the fall leads in on the forecaſtle.

INHAULER reeves through a ſmall block laſhed on the traveller: the ſtanding-part makes faſt to an eye-bolt in the ſide of the bowſprit-cap, and the leading-part comes in upon the forecaſtle.

FORE-TOPMAST-STAYSAIL.

THE STAY reeves through the hanks, then makes faſt with a running eye round the bowſprit, between the collars and ſpritſail-yard, then reeves through the upper ſheave of the cheek-block, at the fore-topmaſt-head, on the larboard ſide; has a double-block turned into the lower end, and connects, by its fall, to a ſingle block laſhed to the after-part of the foremaſt treſtle-trees, leads upon deck, and belays to the main-top-bowline-bitts.

THE DOWNHAULER reeves through a ſmall block that laſhes at the tack of the ſail, then leads through the hanks, and bends to the head of the ſail, and the leading-part comes upon the forecaſtle.

HALIARDS reeve through the lower ſheave of the cheek-block of the fore-topmaſt-head on the larboard-ſide, and bend to the head of the ſail. The leading-part reeves abaft the top to the after-part of the forecaſtle, and belays to a cleat in the ſide.

SHEETS. The bight is bent to the clue of the ſail, and leads through a ſingle-block on each ſide upon the forecaſtle.

OUTHAULER reeves through a block laſhed at the outer end of the bowſprit: the ſtanding-part makes faſt to the tack of the ſail, and the leading-part comes in upon the forecaſtle.

The FORE-SAIL

Is laid athwart the main-ſtay, ready for bending, and the ſheet-block is put over the clue on each ſide. The tack-knot is then thruſt through the clue on the back ſide, and the ſtrap of the clue-garnet-block put through the clues; the eyes are brought up on each ſide, and ſeized at the top.

SHEETS are reeved through the ſheet-block on each ſide, and the ſtanding-part ſeized to a thimble, in an eye-bolt, a little before the gangway. The leading-part reeves through a ſheave-hole in the ſide, a little before the gangway-ladder; then leads forward, and belays round a large cleat in the ſide.

TACKS, SINGLE, lead through the block laſhed round the outer end of the boomkin on each ſide, then lead upon the forecaſtle, and belay round a large cleat upon the cat-head, or to the topſail-ſheet-bitts.

TACKS, DOUBLE. The ſtanding-part reeves round the outer end of the boomkin, and the leading-part through a ſingle-block laſhed to the clue of the ſail, then through the block at the outer end of the boomkin, and leads in upon the forecaſtle.

CLUE-GARNETS reeve through the upper block upon the yard on each ſide, then through the block at the clue of the ſail. The ſtanding-part is carried up, and made faſt round the yard by its block with a timber hitch, and the end ſtopt. The leading-part comes upon deck, and reeves through the ſheave-hole in the topſail-ſheet-bitts, and there belays.

LEECH-LINES reeve through the ſpritſail-brace-block, under the top, then through the block upon the yard, and the ſtanding-part makes faſt with a clinch to the upper bowline-bridle; the leading-part then reeves through a double-block, at the aft part of the top, and upon the forecaſtle.

BUNTLINES reeve through the leg and fall-block, and through a double-block at the aft part of the top; then through a double-block under the fore part of the top, and through the blocks upon the yard, and lead down the fore ſide of the ſail, and clinch to the cringles in the foot. The fall reeves through the leg-block; the ſtanding-part makes faſt round the breaſt-rail, and the leading-part through a ſheave-hole in the breaſt-work, and belays round the rail.

BOWLINES reeve through a ſingle-block laſhed round the collar of the fore-ſtay, on the bowſprit, and the outer part reeves on the bowline-bridle, with a thimble ſpliced in the end, and the bridle clinches to the cringle on the leech of the ſail. The leading-part leads upon the forecaſtle, and belays to the foretopſail-ſheet-bitts.

SLAB-LINES reeve through a ſmall block laſhed to the ſtrap of the quarter-block, and the ſtanding-part clinches with two legs to the middle buntline-cringles. The leading-part leads to the topſail-ſheet-bitts, and belays round the middle of the croſs-pieces.

YARD-ROPES are temporary, and only uſed to get up the ſail; they reeve through tail-blocks that are made faſt round the boom-iron at each yard-arm, and one end comes down and makes faſt to the upper reef-earing. The leading-part leads upon deck, through a leading-block that laſhes to a timber-head or bolt in the gunwale. The ſail is then run up to the yard, where the men go and paſs the

EARINGS, one end of which is ſpliced to the head-cringle, with a long eye; the other end paſſes over the yard-arm without the rigging, through the cringle, alternately, two or three times,

and is paſſed round the yard within the rigging, and through the cringle, till the earing is expended, and the end made faſt with two half-hitches. The outer turns are to ſtretch the upper edge of the ſail tight along the yard, and the inner turns to draw it cloſe.

REEF-EARINGS the ſame.

ROPE-BANDS are braided cordage, with an eye made in one end, and one leg longer than the other. The eye of the long leg is put over the ſhort leg, and the eye of the ſhort leg is thruſt through the eye-let hole at the aft part of the ſail; then the end of the long leg goes over the head of the ſail, and paſſes the eye of the ſhort leg; and ſo of the reſt. The rope-bands being previouſly reeved through the head of the ſail, they are faſtened to the yards by their heads, as follow. The long legs come over the yard from the foreſide, with a round turn between the head of the ſail; the ſhort leg comes up the aft ſide, and makes faſt with a reef-knot upon the yard. The ſail is then let fall to ſee it is clearly bent. For the number of rope-bands, points, and gaſkets, for each ſail, ſee the Table II. among the ſail tables.

POINTS are uſually put in the ſail, at the ſail-loft, thus: an overhand-knot is made in the middle of the point, then thruſt through the ſail, and knotted cloſe to the ſail on the oppoſite ſide.

GASKETS go round the yard with a running eye, two on each quarter, and one on each yard-arm, with a bunt-gaſket in the middle that has two legs, and laſhes to the yard on each ſide of the quarter-blocks.

THE MAINSAIL

Is laid athwart ready for bending, and the

SHEET-BLOCK, TACK, AND CLUE-GARNET-BLOCKS, are placed in the clues, as for the foreſail.

SHEETS reeve through the ſheet-block at the clues. The ſtanding-part is ſeized to an eye-bolt with a thimble on the quarters. The leading-part leads through a ſheave-hole on the ſame ſide under the half-deck, and belays to a range-cleat in the waiſt.

TACKS, SINGLE, reeve through the ſheave-hole in the cheſt-tree, one on each ſide, and through a ſheave-hole in the ſide, and belay round a large range-cleat in the aft part of the waiſt.

TACKS, DOUBLE. The ſtanding-part clinches to an eye-bolt before the cheſt-tree, and the leading-part reeves through a ſingle-block, laſhed to the clue of the ſail; then leads in upon deck through the ſheave-hole in the cheſt-tree ſide.

CLUE-GARNETS, as for the foreſail.

LEECH-LINES reeve through the block upon the yard, and the outer end makes faſt with a clinch to the upper bowline-bridle. The leading-part reeves through the double-block at the fore-part of the top, and through a double-block at the aft-part of the top; a ſingle block is turned into the lower end, and a whip-fall reeved through it. The ſtanding-part makes faſt to the breaſt-rail, and the leading-part through a block under the breaſt-rail, and belays round the rail.

BUNTLINES reeve as for the fore-ſail, and lead forward upon the forecaſtle.

BOWLINES reeve through a double-block that, with a ſtrap, laſhes round the foremaſt five feet above the forecaſtle, and the outer part reeves upon the long leg with a thimble. The lower bridle is the longeſt, and clinches to the lower cringle upon the ſail. In the other end is ſpliced a thimble, through which reeves the upper leg, that clinches to the upper cringle. The ſtarboard-bowline belays on the larboard, and the larboard-bowline leads over and belays on the ſtarboard ſide. Four feet from the bridle is a thimble, ſpliced and pointed on each bowline, called a lizard, to which is

hooked a bowline-tackle that makes faſt to the bitts, and is bowſed upon until the bowline is made faſt to the bitts.

SLAB-LINES, as the foreſail.

YARD-ROPES, and bending as the foreſail.

EARINGS, ROPE-BANDS, POINTS, GASKETS — as the foreſail.

THE FORE-TOPSAIL

Is ſwayed up into the top by the topſail haliards, that make faſt to ſlings round the middle of the ſail, and are then laid in the fore part of the top fair for bending.

SHEETS are firſt paſſed through the fore part of the clue of the ſail, and ſtopt with an overhand-knot. They reeve through the ſhouldered-block at the lower yard-arm, then through the quarter-block, and come down before the maſt: reeve through the ſheave-holes in the bitts, and are there belayed.

CLUE-LINES. The ſtraps of the blocks are paſſed through the clues of the ſail, and brought round the clue to the fore part, and ſecurely ſeized. The clue-lines are paſſed the ſame at the clue-garnets of the lower ſails, and ſometimes have no blocks, but bend to the clue of the ſail.

BUNTLINES reeve through the block upon the yard, come down on the fore ſide of the ſail, and clinch to the cringles in the foot. The leading-part reeves through a ſingle-block, laſhed cloſe under the topmaſt-croſs-trees, leads down through the ſquare of the top, and belays to the ſhrouds.

BOWLINES reeve through the blocks at the bowſprit-cap. The outer part reeves on the lower bowline-bridle with a thimble, as the mainſail. The leading-part comes upon the forecaſtle, and belays to the topſail-ſheet-bitts.

REEF-TACKLE-PENDENTS reeve through the upper ſheave in the ſiſter-block in the topmaſt-ſhrouds, then through the ſheave-hole in the yard-arm, and clinch to the reef-tackle-cringle in the ſail.

REEF-EARINGS reeve through their bights in each reef-cringle, and ſtop to the next cringles and head of the ſail, till uſed.

EARINGS, ROPE-BANDS, POINTS — as for the foreſail.

GASKETS. The yard-arm-gaſket reeves with an eye round the yard-arm within the cleats. Quarter-gaſkets reeve between the arm and the middle. Bunt-gaſkets have two legs, and laſh to the yard, with an eye on each ſide of the tye-block, and faſten thereto, when the ſail is hauled up in the bunt.

THE MAIN-TOPSAIL

Is ſwayed up into the top, as the fore-topſail.

SHEETS, CLUE-LINES, BUNTLINES — as the fore-topſail.

BOWLINES reeve through blocks laſhed round the fore-maſt-head cloſe under the cap: the outer part reeves on the lower bowline-bridle with a thimble, as the fore-topſail. The leading-part comes

down through the ſquare of the top, reeves through a ſheave-hole in the maintop-bowline-bitts upon the forecaſtle, and there belays,

REEF-TACKLE-PENDENTS
EARINGS
ROPE-BANDS
POINTS
GASKETS
} as the fore-topſail.

THE MIZEN-TOPSAIL

Is ſwayed up as other topſails, in large ſhips.

SHEETS
CLUE-LINES
BUNTLINES
} as the fore-topſail.

BOWLINES bend to the ſail as the fore-topſail, and reeve through a ſingle-block ſeized to the main-ſhrouds on the oppoſite ſide near the futtock-ſtaff; they lead down through a ſeizing-truck upon the quarter-deck, and belay round a pin in the fife-rail.

REEF-TACKLE-PENDENTS
EARINGS
ROPE-BANDS
POINTS
GASKETS
} as the fore-topſail.

THE FORE-TOPGALLANT-SAIL

Is either ſwayed up to the topmaſt-croſs-trees by the clue-lines, or bent to the yard below. It is hauled out to the yard-arm by the earings, and bends or laces to the yard, as before obſerved.

SHEETS AND CLUE-LINES are bent to the clues of the ſail, and lead upon deck, as the fore-topſail.

BUNTLINES reeve through a ſmall-block ſeized to the topgallant-maſt-head, then through a thimble ſeized to the tye, cloſe down upon the yard, and bend, with legs, to the cringles in the foot of the ſail. The leading-part comes down into the top.

BOWLINES reeve through the thimbles at the jib-boom-end, and faſten to the ſail as the topſail, only with a toggle to caſt off the bowline for ſending the yard down. The leading-part comes upon the forecaſtle, and belays to a pin in the breaſt-hook.

THE MAIN-TOPGALLANT-SAIL

As the former; the bowlines reeving through the ſheave-holes in the after part of the fore-topmaſt-croſs-trees, and leading down upon deck.

THE MIZEN-TOPGALLANT-SAIL

As the former; the bowlines reeving through the ſheave-holes in the aft part of the main-topmaſt-croſs-trees.

THE JACK-BLOCK is uſed for ſending topgallant-yards up or down; it is ſtrapped with a ſeizing eye, through which reeves a rope, with an eye ſpliced in one end, and a double-walnut-knot made at the other end, called a button-and-loop. It goes round the maſt, is ſecured by the knot being

thruſt through the eye, and is triced up or down the maſt by the topgallant-tye, which bends through the eye of the ſtrap. When the yards are ſwayed up, the top-rope reeves through the jack-block, and makes faſt with a hitch, firſt taken round the yard in the ſlings, then ſtopt at the outer quarter and eye-bolt in the yard-arm. When lowered, the ſame, except the ſtop at the eye-bolt. The rigging is taken off or put on by men at the maſt-head, when the yards are ſwayed up or lowered down.

ROYALS

Are ſet flying.

The HALIARDS hitch round the ſlings of the yard, and through the ſheave-hole in the topgallant-maſt-head, and lead down upon deck.

BRACES go over the yard-arm with an eye; they lead through ſingle-blocks at the next topgallant-maſt-head aft, or mizen-peek, and lead down upon deck.

Eaſt-India ſhips ſometimes have royal-maſts, and then the royals rig ſimilar to topgallant-ſails.

THE MAIN-STAYSAIL

Is ſeldom bent in ſhips but at ſea, though commonly in brigs. It bends to the main-ſtayſail-ſtay with hanks and ſeizings.

STAY. The upper end clinches round the main-maſt-head above the rigging, and the lower end ſets up with a luff-tackle round the foremaſt.

HALIARDS reeve through a ſingle-block bent to the head of the ſail. The ſtanding-part makes faſt round the main-maſt-head, and the leading-part reeves through a block laſhed upon the rigging under the top, and leads down abaft the maſt: a double-block is turned into the end, connected, by its fall, with a ſingle-block, hooked to an eye-bolt in the ſides abaft the main-maſt.

The DOWNHAULER reeves up through the hanks, bends to the head of the ſail, and belays to the main-top-bowline-bitts.

TACK bends to the tack of the ſail, and laſhes the tack of the ſail to the foremaſt or bitts.

SHEETS are doubled, and the bight put through the clue of the ſail; the ends are reeved through, have a ſingle-block ſpliced into each end, and falls reeved. Their ſtanding-parts are made faſt round a timber-head on each ſide the fore part of the quarter-deck, and the leading-parts through a ſnatch-block on each ſide, and belay to the next timber-head. Sometimes a luff-tackle is clapt on to bowſe the ſheets aft.

THE MAIN-TOPMAST-STAYSAIL

Bends to the topmaſt-preventer-ſtay with hanks and ſeizings.

HALIARDS reeve from the aft-ſide through the cheek-block at the main-topmaſt-head on the larboard-ſide, and come down and bend to the head of the ſail. The leading-part leads through a block in the ſide, and belays to a pin in the fife-rail.

The DOWNHAULER reeves through a block ſeized to the ſtrap of the main-bowline-block; it is then carried up and reeved through another block ſeized to the topmaſt-preventer-ſtay at the catharpins, then upwards through the hanks, and bends to the head of the ſail.

BRAILS reeve through blocks that are laſhed to the ſtrap of the main-bowline-block; they are then carried up and reeve through other blocks, ſeized to the topmaſt-preventer-ſtay, at the catharpins, on each ſide, and make faſt on each ſide the ſail to a cringle on the after-leech.

TACKS are doubled; the bight is put through the tack of the ſail, the ends are reeved through the bight, and lead through a thimble ſeized on the lower ſhrouds on each ſide; they then lead down and belay round a cleat laſhed to the ſhrouds near the deck.

SHEETS are doubled; the bight is put through the clue of the ſail, and the ends through the bight. A block is ſpliced in each end, and falls reeved. Their ſtanding-parts make faſt on each ſide to a boatſkid next the quarter-deck, and the leading-parts reeve through a block on the gunwale on each ſide abaft the gangway, and belay to a pin in the boatſkid.

THE MIDDLE-STAYSAIL

Bends to the middle-ſtayſail-ſtay with hanks and ſeizings.

STAY. The ſtanding part reeves up through the hanks, and makes faſt to a thimble ſeized in a ſtrap or grommet made faſt round the fore-topmaſt, under the parral. The leading-part reeves through the upper ſheave at the main-topmaſt-head: a double-block is then turned into the end, and connects, by its fall, with a ſingle-block that laſhes to the main-treſtle trees, and the fall leads upon deck abaft the maſt, by which it is ſet up.

HALIARDS reeve through the lower ſheave of the cheek-block at the main-topmaſt head, and bend to the head of the ſail; the other end leads upon deck abaft the maſt.

THE DOWNHAULER reeves through a ſingle-block ſeized to the ſtay at the nock of the ſail, then leads up through the hanks, and bends to the head of the ſail. The leading-part leads upon deck abaft the foremaſt.

TACKS are doubled; the bight is put through the tack of the ſail, and the ends reeved through the bight, and each end through a thimble ſeized in the fore-topmaſt-ſhrouds, leading down and belaying in the top.

SHEETS are doubled; the bight is put through the ſheet of the ſail, the ends are reeved through the bight, and each end through a block on the gunwale abaft the gangways, and belay round a boatſkid.

TRICING-LINE clinches to the grommet round the fore-topmaſt, and reeves through a block under the fore-topmaſt-croſs-trees, and leads down into the top.

THE MAIN-TOPGALLANT-STAYSAIL

Bends to the ſtay with hanks and ſeizings.

STAY. The upper end ſplices into the topgallant-ſtay below the rigging, and the lower end reeves through a thimble ſeized round the fore-topmaſt-croſs-trees, leading down and making faſt in the top.

HALIARDS reeve through a ſheave-hole a little above the hounds of the main-topgallant-maſt; one end bends to the head of the ſail, and the leading-part comes down upon deck; and belays to the bitts on the quarter-deck abaft the maſt.

THE DOWNHAULER reeves up through the hanks, and bends to the head of the ſail; and the leading-part comes upon deck abaft the main-maſt.

TACKS
SHEETS } as the middle-ſtayſail.

THE MIZEN-STAYSAIL

Bends to the mizen-ſtayſail-ſtay with hanks and ſeizings.

THE STAY clinches round the head of the mizen-maſt, then reeves through a thimble ſeized in a collar laſhed round the main-maſt, and ſets up with a laniard through a thimble turned into the ſtay,

and an eye-bolt in the deck abaft the maſt. In ſmall ſhips, the mizen-ſtayſail bends to the mizen-ſtay.

HALIARDS reeve through a block at the head of the ſail. The ſtanding-part makes faſt round the mizen-maſt-head, and the leading-part reeves through a block laſhed to the treſtle-trees, then through a leading-block in the ſide, and belays round a timber-head.

THE DOWNHAULER reeves up through a block made faſt to the collar of the ſtay, then through the hanks, and bends to the head of the ſail. The leading-part belays round the fore-brace-bitts abaft the main-maſt.

BRAILS reeve through blocks laſhed on each ſide the collar, then through thimbles in a ſtrap put through the ſail, and make faſt to a cringle on the after-leech of the ſail. The leading-part belays round the breaſt-rail on the quarter-deck.

THE TACK ſplices to the cringle in the tack of the ſail, and laſhes it to an eye-bolt in the deck abaft the main-maſt.

SHEETS bend to the clue of the ſail, with a long and ſhort leg, having a thimble ſpliced in the latter. The long leg reeves through a block or bolt in the ſide, and through the thimble in the ſhort leg, and belays round a timber-head in the ſide.

THE MIZEN-TOPMAST-STAYSAIL

Bends to the mizen-topmaſt-ſtay with hanks and ſeizings.

THE HALIARD reeves through the ſheave-hole in the topmaſt above the rigging, or through a block laſhed round the maſt-head; one end bends to the head of the ſail, the other end leads down upon deck abaft the maſt.

THE DOWNHAULER reeves up through the hanks, and bends to the head of the ſail, the other end leads down upon and belays round the breaſt-rail.

TACKS are doubled; the bight is put through the tack of the ſail; the ends are reeved through the bight, and through a thimble ſeized to the main-topmaſt-ſhrouds on each ſide, leading down and belaying in the top.

SHEETS are doubled; the bight is put through the clue of the ſail; the ends are reeved through the bight, and through a thimble ſeized in the mizen-ſhrouds on each ſide, leading down and belaying round a pin in the hand-rail on each ſide.

THE MIZEN-TOPGALLANT-STAYSAIL

Bends to the mizen-topgallant-ſtay with hanks and ſeizings.

THE HALIARD reeves through the hole above the topgallant-maſt-hounds; one end bends to the head of the ſail, the other leads down upon deck abaft the maſt, and belays round a pin in the hand-rail.

THE DOWNHAULER reeves up through the hanks, and bends to the head of the ſail; the other end leads to the main-top, and belays round the top-rail.

TACKS are doubled; the bight is put over the tack of the ſail, and the ends through the latter; they are then reeved through a thimble ſeized in the main-topmaſt-ſhrouds on each ſide, and lead into the top.

SHEETS are doubled, and put through the clue of the ſail at the tacks, and reeved through a a thimble ſeized in the mizen-ſhrouds, on each ſide near the catharpins, then lead down upon deck, and belay round a pin in the ſhroud-rack.

MIZEN-COURSE.

THE EARING reeves, with an eye in one end, round the cringle in the peek of the ſail, and makes faſt round the peek, as other earings; and the earing at the nock of the ſail the ſame as the peek.

LACING is ſpliced to the peek-earing-cringle, and laces round the yard or gaff through the eyelet-holes in the head of the ſail, and makes faſt to the nock-earing-cringle. Lacing round the maſt is ſpliced to the nock-cringle, and laces round the maſt backwards and forwards on the foreſide, and through each cringle on the fore-leech of the ſail, making faſt to the tack at the lower end.

THE TACK ſets up with a laniard reeved through the tack-cringle in the ſail, and through an eye-bolt in the deck.

THE SHEET reeves through a block on a horſe at the fore part of the taffarel, and through another block, that hooks to the thimble in the clue of the ſail, then again through the block on the horſe, and the leading-part belays round a cleat on the ſide.

BRAILS. Throat, middle, and peek, brails reeve through blocks on the yard or gaff, and make faſt to cringles on the after-leech of the ſail on each ſide. The throat-brails lead down by the maſt; the middle-brails lead down to the after-mizen-ſhroud on each ſide; and the peek-brails to the fife-rail on each quarter.

THE FANCY-LINE has two ſpans, with a thimble ſeized in the bight, and a thimble ſpliced in each end; one thimble reeves upon the throat-brail, the other on the middle-brail, on each ſide the ſail. The fancy-line reeves through blocks laſhed at the peek end, and each end bends to the thimble in the bight of the ſpan on each ſide. When the mizen is ſet, the brails are hauled up by the fancy-line, that they may have ſlack, and not girt the lee ſide of the ſail.

THE DRIVER OR SPANKER SAIL

Is bent as a temporary matter, and is made faſt at the peek and nock with an earing, as the mizen, and makes faſt to the yard and gaff with four or five pair of haliards, that reeve through blocks made faſt with tails round the yard or gaff, one end of the haliard being bent to the head of the ſail. The throat-haliards reeve with a double and ſingle block; the former is made faſt round the maſt-head, and the latter hooks to the nock-cringle on the ſail.

THE TACK is ſet tight with a luff-tackle that hooks to the cringle in the tack of the ſail, and to the eye-bolt in the throat of the boom.

THE SHEET reeves through a block or ſheave-hole at the outer end of the boom, and bends to the clue of the ſail; a luff-tackle is cats-pawed to the other end of the ſheet; the inner block hooks to the taffarel, and the fall leads in upon the quarter-deck. When this ſail is bent to the maſt, yard, or gaff, inſtead of the mizen, it bends exactly the ſame, only the foot of the ſail is extended on the boom as above.

DOWNHAULER reeves through a block made faſt to the middle of the driver-yard, and leads down the taffarel.

LOWER-STUDDINGSAILS

Bend to a yard at the head, with rope-bands, the ſame as other ſails.

OUTER HALIARDS reeve through a ſpan-block that is round the lower cap, and bend between the cleats of the ſtuddingſail-yard; the other end leads down upon deck.

INNER HALIARDS bend to the upper inner cringle on the head of the ſail, then reeve through a tail-block made faſt round the quarter of the lower yard, and through another block made faſt round the yard near the maſt, and lead down upon deck.

TACKS bend to the outer clue on the foot of the ſail, and reeve through a block laſhed round the outer part of the boom; they are carried aft, and lead through a block laſhed to the main chains, come through a port, and belay round a cleat in the waiſt. The other is carried forward, and reeves through a block laſhed to the bees of the bowſprit. The main-ſtuddingſail-tack reeves through a block at the end of the boom, and through a block laſhed to an eye-bolt in the buttock; and leads in through a ſnatch-block laſhed on the quarter on each ſide.

SHEETS are doubled; the bight is put over, and the ends through the inner clue on the foot of the ſail; one leads forward, the other aft.

THE FORE-STUDDINGSAIL

Sets flying, or with a boom at the foot. If flying, the foot of the ſail ſpreads on a yard that rigs with a ſpan clinched round each yard-arm. A guy is bent to an eye that is croſſed in the middle of the ſpan, and leads aft through a block laſhed to the main chains, comes in through a port, and belays round a cleat in the waiſt. The ſail, thus rigged, has no tacks. Booms rig as follow. The hook in the inner end hooks to an eye-bolt in the aftſide of the cathead, and the main-ſtuddingſail-boom to an eye in the iron ſtrap on the fore part of the main channel: the end is confined down with a laſhing to the chain-plates. The inner end of the fore-boom is confined down with a tackle made faſt round the inner end of the boom, and the lower block is hooked to an eye-bolt in the wale. The guy clinches round the middle of the boom, reeves through a block laſhed round the ſpritſail-yard, and comes in upon the forecaſtle.

TOPMAST-STUDDINGSAILS

Bend to a yard at the head with rope-bands, or are laced, as the other ſails, and the foot is ſpread upon the boom that ſlides out from the extremities of the main and fore yard through the boom-irons.

HALIARDS reeve through a block in the ſpan round the topmaſt-head, under the cap, and through the jewel-block, that is ſtrapt with a thimble through an eye-bolt in the extremities of the topſail-yards, and bend to the topmaſt-ſtuddingſail-yard; the other end leads down upon deck, and belays to the bowline-bitts.

THE DOWNHAULER reeves through a block laſhed to the outer clue of the ſail, and through a thimble on the outer-leech: it is then made faſt to the topmaſt-ſtuddingſail-yard, juſt within the earing, and leads into the waiſt.

TACKS bend to the outer lower clue of the ſail; they reeve through a block laſhed to the outer end of the boom, and lead aft through a block at the gangway, and belay to a timber-head. Tack of the main-topmaſt-ſtuddingſail leads in upon the after-part of the quarter-deck through a block laſhed upon the quarter.

SHEETS are doubled; the bight is put through the lower inner clue, and the ends through the bight. The after-ſheet of the fore-topmaſt-ſtuddingſail leads in abaft the fore-ſhrouds. The main hauls in upon the waiſt. The fore-ſheet of the fore-topmaſt-ſtuddingſail leads in upon the forecaſtle; the after one before the ſhrouds. On the middle of the boom is faſtened a ſelvagee, or a ſtrap with a thimble, to which is hooked the top-burton-tackle, to ſupport the boom in the middle.

THE BOOMS are run out by the tackles. The ſtrap of the double-block makes faſt through a hole in the heel of the boom, and the outer-block to the boom-iron, and the fall leads along the yard.

THE TOPGALLANT-STUDDINGSAIL

Bends to a yard at the head, as before, and the foot is ſpread on a boom that ſlides out at the extremities of the topſail-yards.

THE HALIARD reeves through a block ſeized round the head of the topgallant-maſt, above the hounds, or rigging, then through the jewel-block, ſtrapt with a thimble through an eye-bolt at the extremities of the topgallant-yards, and bends to the topgallant-ſtuddingſail-yard; the other end leads down the maſt into the top, and belays there.

THE DOWNHAULER makes faſt to the outer yard-arm within the earing, and leads down into the top.

TACKS bend to the outer lower-clue of the ſail, and reeve through a thimble in a ſtrap round the outer end of the topmaſt-ſtuddingſail-boom; and, in merchant-ſhips that have no boom, through a thimble in a ſtrap round the outer yard-arm of the topmaſt-ſtuddingſail, and leads aft the tack of the fore-topgallant-ſtuddingſail to the main-chains. The main leads to the quarter-piece.

SHEETS are doubled; the bight is put through the lower-inner-clue of the ſail, and the ends paſſed through the bight; one end leads forward, and makes faſt to the quarter of the topſail-yard, and the other end leads into the top, and belays to the topmaſt-ſhrouds.

SPRITSAIL.

The ſpritſail bends to the yard as the foreſail.

CLUE-LINES reeve through the blocks upon the yard, and bend or reeve through a block at the clue of the ſail, and lead in upon the forecaſtle.

BUNTLINES, DOUBLE, reeve through a thimble in a ſtrap round the bowſprit, and clinch to the cringles at the foot of the ſail, and lead in upon the forecaſtle.

BUNTLINES, SINGLE, reeve through a thimble ſeized to the ſlings of the yard, and clinch with legs to the cringles in the foot of the ſail, and lead in upon the forecaſtle.

SHEETS, DOUBLE, reeve through a block ſeized to the clue of the ſail; the ſtanding-part clinches to an eye-bolt in the bow, and the leading-part comes in-board.

SHEETS, SINGLE, bend to the clue of the ſail and lead in-board.

SPRITSAIL-TOPSAIL.

The ſpritſail-topſail bends to the yard with lacing and earings.

CLUE-LINES the ſame as the ſpritſail.

SHEETS reeve through the ſheet-block at the ſpritſail-yard-arm, and hook to the clue of the ſail, and lead in upon the forecaſtle through a block laſhed on each ſide the bowſprit.

VESSELS WITH TWO MASTS.

A SNOW is the largeſt two-maſted veſſel, and is extremely convenient for navigation.

The ſails and rigging on the main and fore maſt are ſimilar to thoſe on the ſame maſt in a ſhip, the braces of the ſails on the main-maſt leading forward: beſides which, there is a ſmall maſt, cloſe behind the main-maſt, that carries a tryſail, reſembling the mizen of a ſhip. This maſt, called the tryſail-maſt, is fixed in a ſtep of wood upon deck, and the head fixed by an iron clamp to the aftſide of the main-top.

Veſſels in the navy, that reſemble ſnows, have a rope-horſe, that ſets up abaft the main-maſt with dead-eyes and a laniard, to which the tryſail is bent, by hanks and ſeizings, ſimilar to the tryſail of a ſnow.

An HERMAPHRODITE is a veſſel ſo conſtructed as to be, occaſionally, a ſnow, and ſometimes a brig. It has therefore two mainſails; a boom mainſail, when a brig; and a ſquare mainſail when a ſnow; and amain-topſail larger than the fore-topſail.

Sometimes the boom mainſail is bent to the main-maſt, as a brig; or on a tryſail-maſt, as a ſnow.

BRIG.

The rigging of a brig is little different from the fore and main maſts of a ſhip, the braces of the ſails on the main-maſt leading forward. The after-main-ſhroud muſt be ſerved from the maſt-head to the dead-eye, to prevent its being chafed by the main-boom and gaff. The after-backſtay is fitted with a tackle, that it may be ſlacked when the mainſail jibes, or is bowſed forward by the boom-pendent and tackle. They carry no main-yard, but a croſs-jack-yard.

BILANDER.

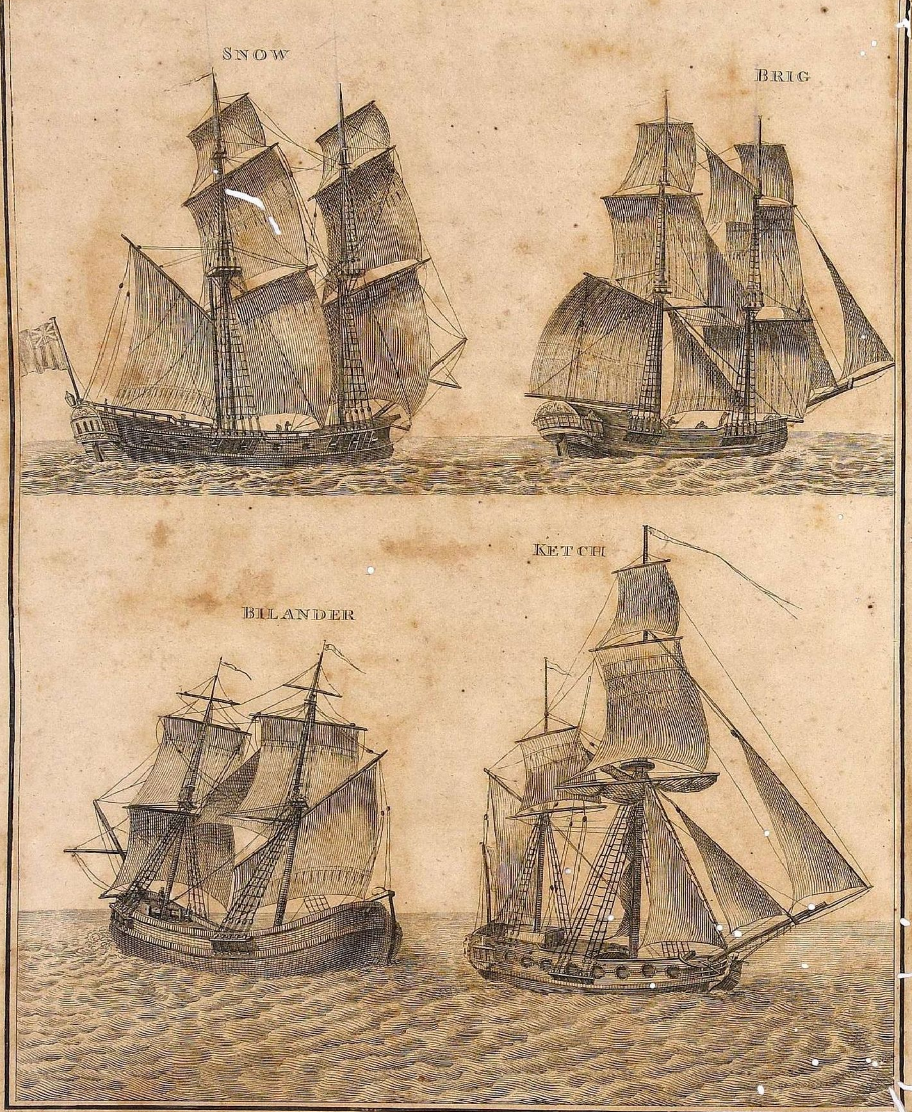
A merchant-ſhip with two maſts, but different from others in the ſhape of the mainſail, which reſembles a ſettee-ſail. The head is bent to a yard, ſimilar to the mizen yard of a ſhip, and hangs to the main-maſt, as a ſhip's does to the mizen-maſt.

This method has proved inconvenient, and is now ſeldom uſed but by the Dutch.

KETCH.

Is a veſſel with two maſts; the main-maſt has a topmaſt, and carries a mainſail, topſail, and topgallant-ſail, ſimilar to a ſhip's; and ſometimes, abaft the main-maſt, is a large gaff-ſail, called a wingſail. The mizen-maſt ſometimes has a topmaſt, and carries a topſail, and, abaft the maſt, gaff-ſail, like a ſhip's mizen. The bowſprit is long, and on it are ſet two or three jibs.

PLATE 1.



Engraved by V. Woodthorpe No. 27 Fetter Lane Fleet Street.

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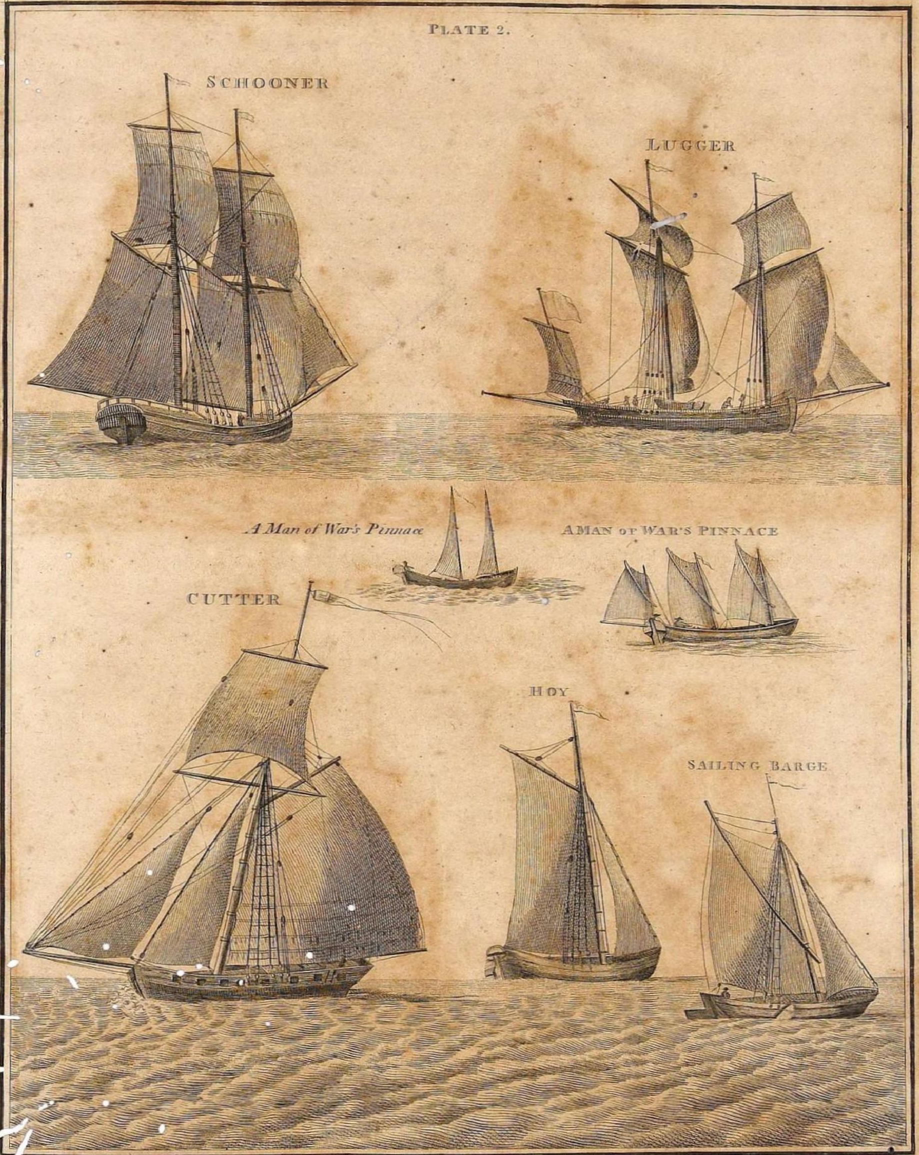
PLATE 2.



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SCHOONER

Is a ſmall veſſel with two maſts and a bowſprit. The maſts rake aft, but the bowſprit lies nearly horizontal. On the bowſprit are ſet two or three jibs; on the foremaſt a ſquare foreſail; and, abaft the foremaſt, a gaff or boomſail; and above thoſe a topſail. Abaft the main-maſt is ſet a boom-ſail, and above it a topſail. The main-ſtay leads through a block, at the head of the foremaſt, and ſets up upon deck by a tackle. By theſe means, the ſail abaft the foremaſt is not obſtructed when the veſſel goes about, as the peek paſſes under the ſtay.

Schooners ſail very near the wind, and require few hands to work them. Their rigging is light, ſimilar to a ketch's, and the topmaſts fix in iron rings, abaft the lower maſt-heads.

LUGGER

Is a ſmall veſſel with two maſts, and a bowſprit nearly horizontal.

On the bowſprit are ſet two or three jibs; and the lug-ſails hang obliquely to the maſts, their yards being ſlung at one-third their length, one on each lower-maſt and topmaſt: the topmaſt fixes abaft the maſt-heads, as thoſe of ſchooners.

Luggers ſail well cloſe hauled, and very near the wind. The rigging is very light and ſimple. The maſts are ſupported by ſhrouds and ſtays; the yards have haliards, lifts, and braces. To the lee-clue of the ſail is a ſheet, and to the windward-clue a tack, which is occaſionally ſhifted as the veſſel goes about. When this is often repeated, they looſe ground in ſtays.

Some luggers have a ſmall maſt and a ring-ſail ſet to it over the ſtern, and the foot ſpread by a ſmall boom.

In blowing weather they have ſmall lug-ſails, the tack of which hauls down by the maſt, as their large ſails would endanger them, ſhould they chance to get up in the wind.

CUTTERS, OR VESSELS WITH ONE MAST.

MAST.

GIRTLINE-BLOCKS are laſhed at the maſt-head, like thoſe of ſhips.

PENDENTS OF TACKLES are wormed, parcelled, and ſerved, their whole length; then doubled, and the bight ſeized to the ſize of the maſt-head: the ends are then ſpliced together, and a ſingle-block ſeized in the lower bight; the ſplice to lay on the arſe of the block.

The ends of all ſplices are tapered, marled down, and ſerved over with ſpunyarn.

RUNNERS OF TACKLES are fitted with a hook and thimble, ſpliced at one end and ſerved over; and reeve through the block in the pendent, and through the ſtrap of the long-tackle-block and ſplices.

FALLS OF TACKLES reeve through the upper ſheave of the long-tackle-block, and through a ſingle-block with a long ſtrap, that has a hook and thimble ſpliced in it, and hooks to an eye-bolt in the ſide. The fall is then taken upwards, reeved through the lower ſheave of the long-tackle-block, and down again through the becket in the arſe of the ſingle-block, and makes faſt with a bend, and the end ſeized up.

SHROUDS, four pairs, are fitted and got over the maſt-head, ſimilar to thoſe in ſhips. The after-ſhroud on each ſide is wormed, parcelled, and ſerved with ſpunyarn, down to the dead-eye.

THE STAY is fitted and got over the maſt-head ſimilar to that in ſhips; only wormed its whole length.

PREVENTER-STAY, ſimilar to ſhips.

THE STAY ſets up with a dead-eye, turned into the lower end of the ſtay with a running or Flemiſh-eye, and with a laniard, reeved through the holes in the dead-eye, and through holes bored through the head of the ſtem.

THE PREVENTER-STAY ſets up with a laniard, reeved through the holes in the dead-eye in the lower end of the ſtay, and another dead-eye in an iron-bound-ſtrap, bolted on the fore part of the ſtem.

BOWSPRIT.

THE SHROUDS are fitted with a hook and thimble, ſpliced at one end, that hook to an eye on each ſide of a ſquare hoop driven on the end of the bowſprit. The inner end has an iron thimble turned in, and ſets up by a laniard to an eye-bolt on each ſide of the bow, and the end ſecured with hitches. Sloops have HORSES ſimilar to jib-boom horſes of ſhips, and ſometimes ratlings.

MAIN-JIB-TACK is clinched through the ſwivel-eye in the traveller on the bowſprit, then reeves through a ſheave-hole in the end of the bowſprit, and through an iron-bound-block, hooked and

moused to an eye-bolt in the side of the stem near the water, and then brought to the windlass over the bow, and hove out; then stopt and belayed round a timber-head.

HALIARDS reeve through the block lashed to the head of the sail, and through the block on each side the mast-head. One end has a treble-block spliced or turned in, and connects by its fall to a double-block, that hooks to an eye-bolt in the deck on one side, and the other end belays to an eye-bolt opposite.

SHEETS, single or with blocks and falls. Sheets, single, are bent to the clue of the sail, and lead over the bow to the windlass; the double-sheets have two double-blocks lashed to the clue of the sail, and connect by their falls to a single-block, hooked to an eye-bolt near the cathead, on each side. The falls lead in upon deck through a hole in a timber-head, or a leading-block lashed on each side.

DOWNHAULER makes fast to the head of the sail, and leads upon deck.

INHAULER makes fast to the traveller, and leads in upon deck.

HEEL-ROPE reeves through a leading-block, hooked to an eye-bolt in the bow, then through a sheave-hole in the heel of the bowsprit, and the standing-part makes fast to a timber-head, or eye-bolt, and the leading-part is connected to the windlass.

FLYING-JIB,

Similar to the main-jib.

FORESAIL

Bends with hanks to the stay.

HALIARDS reeve through a block, lashed underneath the collar of the stay at the mast-head, and a block lashed to the head of the sail: the standing-part makes fast round the mast-head, and the leading-part comes down upon deck.

DOWNHAULER reeves through the hanks, and bends at the head of the sail, then reeves through a leading-block, made fast to the stay at the foot of the sail, and belays to a cleat on the gunwale.

TACK-TACKLE. The block is hooked to the tack of the sail, and connected by its fall to a block, made fast under the stay to an eye-bolt in the bow, and belays to the cross-piece of the windlass.

BOWLINES. A hook is spliced in one end, that hooks to the clue; then reeves through a block, lashed to the shrouds on each side, and through a cringle in the leech of the sail, and belays round a pin in the shroud-rack.

SHEETS reeve through a block made fast to the horse with a thimble, or, in some sloops, a dead-eye iron-bound, and through a block at the clue, and so on alternately between the strap of the block and the seizing or dead-eye; then through the thimble at the clue, till the whole sheet is expended, then frapped together and hitched.

BOOM.

TOPPING-LIFT is taken upon the starboard-side, and reeved through the upper-block, hooked to an eye-bolt in the mast-head; then lead down and reeved through the block at the boom-end. The standing-part clinches round the mast-head, or hooks to the same eye-bolt; the leading-part comes down, and has a double-block spliced in, or turned, that connects by its fall to a single-block, and hooks to an eye-bolt in the after part of the channel, and belays to a pin in the shroud-rack. Sometimes it has the addition of a runner and sometimes rigged as the driver-boom in ships.

SHEETS reeve through a double-block, strapped round the boom just within the taffarel, and through another double-block, strapped round the horse; and very large cutters have a treble-block at the horse, and belays round a large cleat on the taffarel.

TACK-TACKLE. The double-block is faſtened to the tack of the ſail, and connects with its fall to a ſingle-block hooked to an eye-bolt in the deck.

REEF-PENDENTS OR EARINGS, four in number, reeve through four holes in the outer end of the boom, and have a thimble ſpliced in one end, wormed and ſerved with ſpunyarn near their whole length. The other end reeves through its reſpective reef-cringle on the after-leech; and, when a reef is to be taken in, it is cats-pawed on to the hook of a luff-tackle, to haul down the leech of the ſail; and afterwards fraps round the ſail and boom, till expended, and makes faſt with a hitch. It is common to put old hammocks under the pendent between that and the ſail.

GUY-PENDENTS have a hook and thimble, that hook in a thimble of a ſtrap on the boom, juſt without the main-ſheet-block. In the inner end of the pendent, is a thimble or long eye ſpliced, to which is hooked a luff-tackle. Its ſingle-block is hooked near the windlaſs, to a timber-head or eye-bolt, and the fall leads in-board.

MAIN-SHEET. One block ſtraps round the boom near the taffarel, and is confined by a comb-cleat. The other block is ſtrapped with a thimble, and traverſes upon an iron horſe, ſecured to the inſide of the taffarel, and they are connected by the ſheet or fall which belays round a large cleat on the taffarel, or the pin of the block in ſmall veſſels.

TYE, OR HALIARD, reeves through a block on the ſpan, that clinches or ſplices round the middle of the gaff. The ſtanding-part of the tye clinches round the maſt-head, or hooks to an eye-bolt in the maſt-head: the other end reeves through a ſecond iron-bound-block, hooked to an eye-bolt in the maſt-head, and at the lower end is the double-haliard-block, that does not ſplice as other haliards, but reeves through the ſtrap, and makes faſt with a hitch; and the remainder is expended in turns round the block and ſtrap. The haliard-block connects by its fall to a ſingle or double block, hooked to an eye-bolt in the deck, cloſe behind the maſt.

INNER-TYE is ſimilar to the outer tye, and hooks to an eye-bolt in the jaws of the gaff; then reeves through the lower iron-bound-block, that hooks to an eye-bolt in the aftſide of the maſt-head, below the rigging. It has a double-block bent to the lower end, and ſets up by the haliards; the lower block hooking to an eye-bolt on the oppoſite ſide to the other tye.

PEEK-DOWNHAULER reeves through a ſmall-block, ſtrapped round the thimble, in the eye-bolt at the outer end of the gaff, and belays round a cleat under the boom.

THROAT-DOWNHAULER reeves through a block at the nock of the ſail, and leads down the maſt.

TOPMAST, OR TOPGALLANT-MAST.

SHROUDS are fitted and go over the maſt-head as a ſhip's topgallant-maſt-ſhrouds, and thimbles are ſeized in them, in the upper part, for the lifts, and reeve through the holes in the ends of the croſs-trees; then come down upon deck, and ſet up with a thimble and laniard round the lower dead-eyes.

STAY ſplices with an eye to the ſize of the maſt-head; the lower end reeves through the middle ſheave of a treble-block, laſhed round the bowſprit-end underneath, and leads to an eye-bolt near the ſtem, to which it ſets up with a laniard, through a thimble turned into its end.

STANDING-BACKSTAYS, if one pair, go over the maſt-head with a cunt-ſplice: if two pair, with eyes ſeized, and in the lower end a thimble, and ſet with a gun-tackle-purchaſe, hooked to a thimble of a ſtrap round the lower dead-eyes, and ſometimes with a laniard and thimbles.

CROSS-JACK-YARD.

TOP-ROPE, ſimilar to ſhips.

QUARTER-BLOCK is ſtrapped with a double ſtrap, having a long and ſhort leg; and is fixed in the middle of the yard between the cleats: the long leg comes up the aftſide of the yard, and meets the bight of the ſhort leg on the fore ſide, and there laſhes through the bights.

STRAPS, with a thimble ſeized in the bight, are ſpliced or laſhed through eyes round the middle of the yard: the thimble in one ſtrap is fixed on the aftſide of the yard, the other thimble on the upper ſide of the yard.

CLUE-LINE-BLOCKS are laſhed with two eyes round the yard, as ſhips. Some ſloops and light-rigged veſſels have no clue-line-blocks: they lower the yard.

HORSES go over the yard-arm with an eye as in ſhips.

BRACE-PENDENTS, as ſhips AFTER-BRACE-PENDENTS, go over the yard-arm with an eye.

SHEET-BLOCK ſtraps in the lift with a ſplice; and a bight is ſeized in the lift to the ſize of the yard-arm; and goes over it next the braces. Merchant-veſſels ſometimes have their topſail-ſheets fitted in the ſame manner.

FORE-BRACES reeve through the pendent-block. The ſtanding-part goes out, and clinches round the outer end of the bowſprit; the leading-part reeves through a ſheave, on one ſide of the treble-block, out at the end of the bowſprit, and comes in upon deck.

AFTER-BRACES lead in upon the quarter, through a ſnatch-block, or a ſheave-hole in the ſide; and belay to a cleat or timber-head.

LIFTS reeve through a ſpan-block round the cap or maſt-head, and lead down upon deck.

TACKLE OR HALIARD, for ſwaying up the yard, is either treble or double, according to the ſize of the veſſel. The upper block hooks to an eye-bolt in the foreſide of the maſt-head, or to a ſtrap round the maſt. The lower-blocks hook to the thimble in the ſtrap, on the middle of the yard; the fall reeves through a ſheave-hole in the topſail-ſheet-bitts, and leads aft.

HORSE laſhes round the maſt-head, with an eye ſpliced in the upper end, and ſets up with dead-eyes and a laniard below.

TOPSAIL-YARD.

TYE reeves from aft, through the ſheave-hole in the maſt-head, comes down, and clinches round the ſlings of the yard: the other end has a double-block ſpliced, that connects by its fall to a ſingle-block hooked in the channel; the fall leads through a leading-block on the gunwale, and belays to a cleat or timber-head.

CLUE-LINE-BLOCKS, HORSES, BRACE-PENDENTS, AND LIFTS, go on the yard as ſhips.

LIFTS reeve through a thimble in the topmaſt-ſhrouds, and come down upon deck.

BRACES reeve through the pendent-block, and the ſtanding-part goes out and clinches round the bowſprit-end; the leading-part reeves through one of the ſheave-holes of a double-block at the bowſprit-end, leads in upon deck, and belays where moſt convenient.

BOWLINES reeve through a thimble in a ſtrap over the bowſprit-end; and go on the bridle at the ſail, as in ſhips: the leading-part comes in upon deck.

MAINSAIL

Bends at the head to the gaff with earings and lacing, as the ſhip's mizen; and is ſeized to the hoops round the maſt, through the holes in the foremaſt-leech.

THROAT-DOWNHAULER. The double-block hooks to the eye under the throat of the gaff, that connects by its fall to a ſingle-block, hooked to a thimble, ſeized in the bight of a ſtrap round the maſt under the boom-ſaddle.

TRICING-LINE reeves through a ſmall block made faſt to the above eye-bolt in the gaff: one end ſplices to the tack of the ſail; the other leads down upon deck, and belays to a cleat near the maſt.

SHEET-ROPE ſplices into the clue of the ſail, and reeves through the ſheave-hole in the boom; and a thimble is turned into the inner end, to which hooks the ſheet or luff tackle, and the inner-block to a ſtrap round the boom near the jaws. When the ſail is hove out, it is laſhed with an earing through the clue, and an eye-bolt in the boom-end.

TRYSAIL OR STORM-MAINSAIL

Bends as the mainſail, and rigs with the ſame materials, if no other allowed; but moſtly with ſheets, and no boom, but like a ſhip's mizen.

SQUARE-SAIL OR CROSS-JACK

Bends ſimilar to a ſhip's main or fore courſe.

BOWLINES reeve through a ſheave in the double-block on the bowſprit-end, and on the bridle at the ſail, the ſame as a ſhip's. The leading-part comes in upon deck, and belays round the bitts.

TOPSAIL

Bends as the ſhip's topſail, and rigs ſimilar.

TOPGALLANT-SAIL ſets flying like a ſhip's royal.

GAFF-TOPSAIL

Laces to a ſmall gaff at the head.

HALIARDS reeve through a ſheave-hole at the topgallant-maſt-head, and bend to the inner-part of the gaff: the leading-part comes down upon deck.

TOPPING-LIFT reeves through a ſheave-hole or ſmall-block, ſeized to the topgallant-maſt-head, then through a thimble or ſmall-block ſeized at the outer end of the gaff: the ſtanding-part makes faſt round the topgallant-maſt head, above the ſheave-holes; and the leading-part comes down upon deck.

TACK makes faſt the tack of the ſail, a little above the rigging.

SHEET reeves through a thimble ſeized at the peek of the mainſail, and bends to the clue of the ſail, and leads down upon deck.

LOWER STUDDINGSAILS

Bend as ſhips', and is ſet flying like a ſhip's fore-ſtuddingſail.

TOPMAST-STUDDINGSAILS

Bend nearly as ſhips'.

HALIARDS reeve through ſingle-blocks, made faſt round the maſt-head above the rigging: one end reeves through the jewel-block, and bends to the yard: the other end leads down upon deck.

SHEETS AND TACKS, as ſhips'.

RINGTAIL-SAIL

Is ſimilar to a topmaſt-ſtuddingſail, and bends to a ſmall yard on the head, and hoiſted by the peek downhauler, which ſerves for haliards. The foot is expanded on a ſpar, or ſmall boom, laſhed to the outer end of the main-boom.

MIZEN

Is ſet on a ſmall maſt over the ſtern. If a ſquare-ſail, it bends to a yard, and is hoiſted by haliards reeved through the maſt-head, and is ſpread by ſheets at the foot. If a ſpritſail, it bends to the maſt with grommets, and is peeked with a ſprit; and the foot hauls aft by the ſheet to a ſmall boom.

WATER-SAIL

Is ſimilar to a lower ſtuddingſail, and bends on the head to a ſmall yard.

HALIARD reeves through a ſmall block under the outer end of the main-boom, comes in and makes faſt to the middle of the yard, and the leading-part round a cleat on the taffarel.

SHEETS make faſt to the clues of the ſail, and lead in over the quarters.

SAVEALL-TOPSAIL.

The CLUES laſh near to the lift-block of the croſs-jack-yard.

HALIARDS bend to the earings of the ſail, and reeve to a block on each quarter of the topſail-yard; and leads down upon deck.

SLOOPS AND SMACKS

Are veſſels with one maſt, and rig as cutters, but much lighter.

HOYS AND LIGHTERS

Are veſſels with one maſt, and ſometimes a bowſprit; abaft the maſt is a gaff-mainſail, before it a foreſail, and a jib upon the bowſprit. The little rigging they have is ſimilar to ſloops'.

SAILING-BARGES

Are veſſels with one maſt, and ſometimes a bowſprit. Thoſe that have boom-ſails are rigged ſimilar to ſloops; but, having few hands on-board, the boom and gaff is more eaſily hoiſted or topped, the power being increaſed by the addition of blocks.

The BOOM-TOPPING-LIFT is a long pendent, that goes over the outer end of the boom, with an eye ſpliced in one end, and in the other end is ſpliced a double or ſingle block, that connects by its fall to a ſingle-block, hooked in an eye-bolt at the upper part of the maſt-head; and the fall leads down to the ſhrouds at the ſide, and ſometimes rigged ſimilar to a ſhip's driver-boom, or cutter's main-boom.

TYE OR HALIARDS of the gaff are rigged to the fancy and eaſe of the maſter, &c. The ſtanding-part is faſtened to the arſe of a ſtanding-block, hooked to an eye-bolt in the maſt-head,

next below the topping-lift; then reeves through a ſingle-block on the ſpan at the peek; then carried up; and reeves through the block near where the ſtanding-part is made faſt; then through another block, on a ſpan near the middle of the gaff, and leads up again, and reeves through another ſingle-block, hooked to an eye-bolt in the maſt-head, below the other block or ſtanding-part, and leads down upon deck; ſometimes the ſtanding-part goes over the maſt-head, with an eye ſpliced in the end; then reeves through a block at the peek-end of the gaff, and then through a ſingle-block at the maſt-head, below the ſtanding-part; and then through a ſingle-block on a ſpan near the peek; laſtly, through another block at the maſt-head, below the former block; and then leads down upon deck. The tye has moſtly haliards in the lower end, like the cutters.

SAILING LIGHTERS OR BARGES, with a ſprit-mainſail, rig with a ſprit-yard at the head of the ſail, hanging diagonally to the maſt.

THE SHROUDS AND RUNNER-PENDENTS go over the maſt-head, with eyes ſpliced at the ends, or with bights ſeized cloſe to the maſt; and reſt upon a trudding or grommet, drove down to the ſtops on the maſt-head.

THE STAY goes over all with a running-eye, and ſets up with a large three or four fold tackle: the upper-block hooks in a large thimble, turned into the lower end of the ſtay, or is itſelf turned into the lower end of the ſtay, and the lower block is ſecured to the ſtem, by hooking into a large ſtrap, for lowering the maſt.

THE STAY OR STANDING-MAST is ſet up with a dead-eye, or block, in the lower end, and holes through the head of the ſtem.

SPRIT-YARD-PENDENT. One end ſplices to a collar or grommet, that is ſpliced round the middle of the ſprit-yard; the other end reeves through a block at the maſt-head, comes down, and then a thimble is ſpliced in, and ſerved over the ſplice: in this thimble hooks a double-block (in large barges), that connects by its fall a double-block, hooked to an eye-bolt in the deck: a luff-tackle is uſed in ſmall barges.

STANDING-LIFT, to top the ſprit-yard up, goes with an eye ſpliced in the end over the lower end of the yard; then leads through a block at the maſt-head, has a thimble ſpliced in the end, to which hooks a double or luff-tackle block, and the lower-block hooks to an eye-bolt in the deck or ſide.

VANGS. Some large barges have vangs like a ſhip's mizen, and a downhauler at the peek-end of the ſprit-yard.

HALIARDS OR TRICING-LINE make faſt to the grommet at the nock of the ſail, and reeve through a block at the maſt-head, and lead down upon deck.

THE SPRITSAIL is bent to hoops, that ſlide on the maſt above the ſnotter, and to hanks below it, that ſlide on a horſe abaft the maſt: the tack is ſecured with ſeveral turns round a cleat on the maſt, or eye-bolt in the deck, and through the thimble in the tack of the ſail. The turns are frapped together, and the end hitched: the nock is ſecured in a ſimilar manner to a grommet, encircling the maſt: the peek is extended to the upper extremity of the ſprit-yard, by its going through the peek.

THE SHEET. One end bends to the clue of the ſail, the other reeves through a block that traverſes on an iron or wood horſe (fixed athwart the veſſel near the ſtern), and again reeves through a block, hooked to a thimble in the after-leech of the ſail, four feet above the clue; then leads aft, and belays round the pin of the block on the horſe.

BRAILS are made faſt to cringles on the after-leech of the ſail, then lead upon each ſide of the ſail, and reeve through ſmall-blocks, ſeized into the head-rope; and then through blocks laſhed to

the upper part of the ſhrouds on each ſide; and lead down through trucks ſeized to the ſhrouds below the middle, and belay round pins in the ſhroud-rack.

BRAILS go with two ſhort legs; one ſpliced in the head-rope near the nock, the other about four feet up the head: the leading-part comes down one ſide of the ſail, and reeves through a cringle, on the after-leech, five or ſix feet above the clue, and comes upon the other ſide, and reeves through a block, ſeized to the nock of the ſail, and leads down by the maſt.

THROAT DOWNHAULER ſplices to the nock of the ſail, and leads down by the maſt.

HORSE is a rope that goes with an eye over the maſt-head, and ſets up with a laniard through dead-eyes; one of which is ſpliced in the lower end of the horſe, and the other hooks to an eye-bolt near the heel of the maſt.

SNOTTER is made of two or more turns of a rope, ſpliced at the ends, and marled cloſely together, to the circumference of the maſt and lower end of the ſprit-yard; then ſerved with ſpun-yarn, and covered with leather, and a ſeizing clapped on, between the maſt and lower end of the ſprit-yard, which reſts in the grommet, by the ſtop or ſhoulders made at the end, when the ſail is hoiſted.

LARGE BARGES have a FORESAIL, JIB, CROSS-JACK-YARD, and TOPSAIL, ſimilar to ſloops.

SLOOPS, SMACKS, BARGES, and LIGHTERS, that go through bridges, have the maſt confined in a trunk or wooden cap, above the deck, and faſtened in by an iron ſtrap on the aft-ſide: ſome have a ſtrong iron hinge at the heel of the maſt, or a bolt through the heel; ſo that it can be lowered at pleaſure, by the ſtay-tackle eaſing away the fall by degrees. To raiſe the maſt, the fall is brought to the windlaſs, and hove upon, until the maſt is up in its place: the fall is then ſtopped to the windlaſs bitts.

SHIPS' LONG-BOATS, OR LAUNCHES,

Are often rigged like ſmall ſloops or ſchooners.

SHIPS' PINNACES AND ROWING BARGES

Sometimes have latteen-ſails, and rig with a ſliding-gunter, like houarios, or bend to yards, and hoiſt with

HALIARDS, that reeve through a ſheave-hole in the maſt-head: one end bends to the ſlings of the yard, on the fore-part of the maſt, and the other end belays abaft the maſt.

SHEETS bend to the clue of the ſail, and lead aft.

SPRITSAILS, ſimilar to thoſe in ſailing barges, are ſometimes uſed.

SHIPS, CUTTERS, OR YAWLS,

Sometimes have lug-ſails, and rig with a

HALIARD, like the pinnace.

SHEET AND TACK, like the lugger.

NECESSARY ROPES, AND VARIOUS OPERATIONS, INCIDENTAL TO RIGGING, PERFORMED ON-BOARD.

AWNINGS. The ridge rope of the poop-awning reeves through the trucks, ſerved along the midſhips of the awning; the ſtanding-part makes faſt with a clinch round the enſign-ſtaff, the leading-part round a roller fixed in the aftſide of an iron claſp-hoop on the mizen-maſt, and ſets up, by a fall, which connects a double-block, turned into its end, to a ſingle-block laſhed to an eye-bolt in the deck. The ſide ropes reeve through trucks, ſerved alongſide the awning, with an eye ſpliced into the end of the ſtanding-part, through which it is ſeized with ſpun-yarn to the fore leg of the mizen-ſhrouds on each ſide. The leading-part reeves through a ſheave-hole in the upper part of a wooden ſtantion, fixed againſt the ſtern on each ſide, and ſets up with a ſmall tackle.

The ridge rope of the quarter-deck-awning reeves through the trucks in the middle of the awning, and clinches through an eye in the fore ſide of the claſp-hoop on the mizen-maſt; and the leading-part reeves round a rollar, fixed in the aft-ſide of an iron claſp-hoop on the main-maſt, and ſets up as the poop-awning. The ſide ropes reeve through trucks along the ſides of the awning, and ſeize to the foremoſt leg of the main-ſhrouds; the leading-part reeves through a block, ſeized to the foremoſt leg of the mizen-ſhrouds, and ſets up as the ridge rope.

The ridge rope of the main-deck-awning reeves through the trucks in the middle, and clinches through an eye in the claſp-hoop on the main-maſt; and the leading-part reeves round a roller, fixed in the aft-ſide of an iron claſp-hoop on the fore-maſt, and ſets up as the poop-awning. The ſide ropes reeve through the trucks, and are ſeized to the foremoſt leg of the fore-ſhrouds; the leading-part reeves through a block, ſeized to the foremoſt leg of the main-ſhrouds; and ſets up as the quarter-deck-awning.

The awnings are ſpread and ſuſpended by the middle thus. In the after ends three thimbles are ſeized, one in the middle, and one on each ſide, that go over hooks, ſeized to the hoop on the maſt, and ſhrouds at the ſides. The fore part is hauled forward, and ſtopt to the ſhrouds, and laces acroſs through eyelet-holes, made at the edges of each awning. In harbour the awnings ſpread to wooden ſtantions, bolted along the ſides; and, the hands being few, they are hauled forward by tricing-lines, reeved through ſingle-blocks, ſeized to uprights inſtead of the maſts. In the middle of the awnings, the legs of the crowfoot reeve through the holes in the euphroe, and make faſt to the ſtrands of the ridge rope, at equal diſtances; and that is ſuſpended by the haliard that is ſpliced round the euphroe, and reeves through a ſingle-block ſeized to the ſtay.

BENTINCK-SHROUDS have four or ſix ſhort legs, with an eye ſpliced in the end of each, which ſeizes round the futtock-ſtaff and ſhrouds, cloſe up to the catharpins. The bights of thoſe legs are parcelled and ſerved together, and a large thimble ſeized therein; in which is turned in another large thimble. The bight of the bentinck-ſhrouds is parcelled, and ſerved in the way of this thimble,

round which they are ſeized with a round ſeizing. A thimble, or dead-eye, is turned into the lower ends, which ſets up with a laniard to a ſpare dead-eye, or eye-bolt, in the chains, on the oppoſite ſides.

BOATS. The NECESSARY ROPES belonging to theſe are: the PAINTER, which ſplices round a thimble in the ring-bolt within the bow. The STERNFAST ſplices round a thimble in the ring-bolt within the ſtern. FENDERS are made of worn cable-laid rope, doubled three or four times, and ſewed together with ſpunyarn thus: the rope is firſt doubled, and a laniard thruſt through the bight, and a wall-knot crowned on the end: the ends are then brought up in the bight, and the four parts ſewed together. RUDDER-LANIARDS: the ends are thruſt through holes in the after part of the rudder, on contrary ſides; and a double wall-knot, crowned, is made at the ends; the inner ends make faſt on each quarter of the boat withinſide. SLINGS have a hook and thimble ſpliced in each end, with a long and ſhort leg, by having a thimble ſeized in the bight at one-third the length.

BOOMKIN-SHROUDS, to ſupport the boomkins, have their after ends hooked to eye-bolts, one above the cheeks of the head, the other in the cutwater: at the fore part, or bight, is ſeized in a dead-eye, or thimble, which ſets up with a laniard to a dead-eye, or thimble, ſeized in a ſtrap fixed round the outer end of the boomkin.

DOLPHINS are made of a piece of worn hawſer-laid rope, nearly as long as the circumference of the maſt, which has an eye ſpliced in each end, and is pointed over the whole length. They are occaſionally laſhed round the maſt, through the eyes, as a ſupport to the puddens.

ENTERING-ROPE. See ROPE.

FLAGS. Flags and pendents are hoiſted by haliards which reeve through ſheaves in the trucks at the maſt-heads or ſmall-blocks, ſeized where wanted. The two ends of the haliards ſplice together, and reach down to the tops, or down upon deck, and belay; one part of the haliards is bent to the upper part of the tabling, to the lower end, and to ſeveral places between, and in proportion as one is hoiſted upon, the other is eaſed away, until the flag is hoiſted. The haliards are then belayed.

Haliards of pendents are bent to ſlings ſpliced round the ſtick; conſequently to haul a flag or pendent down, that part that was hauled upon muſt now be eaſed.

The enſign-haliards reeve through a ſheave in the truck of the enſign-ſtaff, and belay to a cleat near the heel.

The jack-haliards reeve through the ſheave in the truck of the jack-ſtaff, and belay to a cleat at the heel near the bowſprit.

Signal-pendent-haliards are reeved through blocks or thimbles ſeized to different parts of the ſhip, as the croſs-trees, &c.

Signal-flags are hoiſted at the mizen-peek, &c. Night-ſignals are made with lanthorns, and are hoiſted by the ſame haliards as the flags.

The broad-pendent is hoiſted with the ſhorteſt ſide next the maſt.

FRAPPING of a ſhip is performed by paſſing a number of turns of a cable over the gunwale and round the hull, and heaving it tight, by thruſting a capſtan-bar through the middle of the turns, and twiſting them together. The turns are then ſecured by ſtopping the end of the bar. This is moſtly uſed when the upper works of a ſhip are not ſtrong enough to reſiſt the violent ſhocks of a heavy ſea.

GRIPES are ſhort ropes, ſpliced together in the middle, with a dead-eye ſeized in one bight. The ſplice lying on the back of the dead-eye, and a hook and thimble ſeized in the other bight, which hook to ring-bolts in the deck. The ſtraps are ropes, in length once and a quarter the width of the

boat, ſpliced together in the middle, and a dead-eye ſeized in each bight; they are uſed to ſecure the boats upon the deck in this manner: the ſtraps are laid athwart the boat forward, in midſhips, and aft, and ſet up with laniards, through the holes in the dead-eyes of the ſtraps, and thoſe hooked to the ring-bolts in the deck.

GROMMETS. Worn rope ſpliced together in the form of a wreath, of various ſizes, according to the purpoſes to which they are to be applied. Thoſe for confining the nock of ſpritſails are ſerved over with ſpunyarn, and are ſometimes covered with leather.

GUN-TACKLES. Gun-tackling conſiſts of ropes, blocks, &c. and is to run the guns in and out, and ſecure them to the ſhip's ſides in bad weather. Breeching is a rope to ſecure and prevent the gun from recoiling too much. It is formed with a cunt-ſplice in the middle, which paſſes over the pomiglion, or caſcabel, of the gun, and through ring-bolts in each ſide of the carriage, and is clinched to large ring-bolts in the ſide of the ſhip, on each ſide of the port. Preventer-breeching is ſimilar to the breeching, and is uſed for additional ſecurity. The gun-tackle is uſed to run the gun out of the port, and keep it in a ſituation for firing. It has a ſingle-block that hooks to the eye-bolts in the ſides of the carriage, and a ſingle or double block, for 32-pounders, that hooks to other ring-bolts by the ſides of the ports. Relieving, or train-tackles, are to run guns in, and ſo retain them, by hooking the double-block of the tackle to an eye-bolt in the train of the carriage, and its ſingle-block to another eye-bolt in the deck; one of which is fixed oppoſite to every gun. Quoins (beſides thoſe uſed to elevate and depreſs the gun) are tapered pieces of wood, like wedges, that are thruſt under the trucks of the carriages, and there kept, by being nailed to the deck; they are uſed to aſſiſt in keeping the gun ſecurely houſed.

Guns are houſed, or ſecured, by taking out the quoins and lowering the breech, ſo that the muzzle may take the upper part of the port. When thus placed, the two ſides of the breeching are frapped under the gun at the muzzle near the breaſt part of the carriage. The muzzle of the gun is confined by ſeveral turns of a rope, or gaſket, made faſt to it, and through the eye-bolts that are fixed in the ſhip's ſide, over the midſhips of the port.

The lower deck guns are uſually kept houſed and ſecured when at ſea.

LASHING OF BOOMS, that is, the ſpare topmaſts, yards, &c. ſtowed on the boatſkids on each ſide. They are firſt ſecured in different places with ſeveral turns of laſhing on one ſide, independant of the other; then they are croſs-laſhed together in a ſtrong manner, and well frapped in the middle. In gales of wind, to prevent the boom's ſhifting, ſeveral turns, with a hawſer, are taken round the booms, and through large triangular ring-bolts in the ſides; and ſometimes the turns are paſſed through an oppoſite port, and round the ſide; the turns are then hove tight, frapped, and belayed.

MATS are made thus: a ſmall rope or line is firſt tightly extended, horizontally, at nearly a man's height, and made faſt at each end; acroſs which foxes are placed in a regular manner, and hang down from their middles: then, beginning with the firſt next the left hand, it is croſſed or plaited with that which is next the right hand; then taking that which was to the right hand and croſſing it with its next; and ſo on in ſucceſſion. This will make the mat downwards; and when finiſhed to the length intended, it is begun again at top till its breadth is completed. Each twiſt is to be preſſed tight; and each couple of foxes is to be twiſted together at the bottom, to keep in their twiſts till the next in ſucceſſion are interwoven with them. When the mat is completed to its depth, the bottom is ſelvaged, by placing another ſmall rope or line acroſs in a tight manner ſimilar to the head-line, round which one fox is half hitched, while the next fox is laid up at the back of it, and ſo on alternately.

When mats are thrummed, it is thus performed: ſhort pieces of the foxes are thruſt under every other overlay of the foxes in every other row. To receive the thrums, a hole is opened with a ſmall marline-ſpike: the thrums are afterwards cut off to an equal length, and their ends opened.

MARTINGAL-STAY, to ſupport the jib-boom, ſplices with an eye over the outer end of the jib-boom, then leads in through a ſcore, cut in the lower end of the martingal, (which is an aſh bar, ſuſpended from the fore ſide of the bowſprit-cap to which it faſtens) has a double-block turned or ſpliced into the inner end, that ſets up, by its fall, to a ſingle-block hooked to an eye-bolt in the head.

NETTING is made by laying parallel to each other a number of ſmall ropes of equal lengths; and by ſeizing each two together at certain diſtances; taking care that every ſeizing be between the ſeizings of the ropes immediately preceding. Or it is made by placing nails in the deck to regulate the ſize of the meſhes, and ſeizing the ropes together cloſe to the nails.

PARBUCKLE. A contrivance to hoiſt or lower bodies, by faſtening the bight of a rope over a fixed object, and paſſing the ends of it under the body to be hoiſted, &c. They are then turned upwards toward the bight, and hauled upon, or ſlackened, as occaſion requires.

PASSING-ROPE. See Rope.

PREVENTER-SHROUDS are made of a ſpare hawſer, the bight of which is well parcelled: the end is paſſed round the maſt-head between that and the topmaſt, and ſeizes as the other ſhrouds. At each end is turned in a dead-eye, that ſets up with a laniard to a ſpare dead-eye in the channel.

PORT-TACKLES have a ſpan with a ſingle-block, croſs-ſeized in the bight; each end of the ſpan is then thruſt through holes in the ſide of the ſhip, and clinches, or ſplices, to a ring-bolt on each ſide of the port: obſerve, the port ſhould be cloſe ſhut, that the ſpan may be of ſufficient length. Through the ſingle-block in the ſpan is reeved a runner; in one end of which is ſpliced an eye, that goes over a hook driven in the ſide of the beam. The other end of the runner ſplices, or turns in to an eye, made by one end of the fall ſpliced round another ſingle-block, which ſerves as a ſtrap to the ſame. The other end of the fall reeves through another ſingle-block ſtrap, with an eye that goes over a hook driven into the ſame ſide of the beam, and the leading-part of the fall belays round an iron clamp, nailed on the ſide of the beam.

PORT-TACKLES on the Quarters have a ſpan and ſingle-block turned in the bight, as the lower ports, and the ends ſpliced in the ring-bolts in the ports without ſide. The fall is ſpliced round a timber-head, or eye-bolt, in the ſide, and the leading-part reeves through the block in the ſpan, and is hauled upon by men on the deck.

PUDDENING of MASTS and YARDS. A ſmall rope, in length twice the diameter of the maſt or yard, has an eye ſpliced in each end, then ſtretched, and parcelled with worn canvas, woolded round with rope-yarn, tapering towards the ends, and holding a large ſubſtance in the middle; then ſerved over with ſpun-yarn, and ſometimes pointed. It has a laniard ſpliced in one eye, and fixes to the maſt or yard, by paſſing the laniard alternately through the eyes, and ſtopping the end. When uſed on maſts, they are to ſuſtain the weight of the yards, if an accident happens to the rigging; and, on the yards, to prevent the ſheets from chafing the rope-bands, &c.

RELIEVING-TACKLES, uſed when the tiller-ropes are damaged, have one end made faſt to a rope ſtrap, with a thimble on each ſide of the tiller, and the other end to an eye-bolt in the ſide.

ROLLING-TACKLES, to main and fore topſail-yards, are hooked to a ſelvagee or ſtrap round the lower cap, alſo to a ſtrap or ſelvagee round the inner quarter of the yard, and is bowſed tight by its fall on each ſide in the top, and belays round the maſt.

ROPES. Entering-ropes hang from the upper part of the ſtantions at the gangways. The upper end is thruſt through an eye in the ſtantion, and is walled and crowned; and diamond-knots are made at about nine inches aſunder along the whole length. Passing-ropes, which lead round the ſhip through the eyes in the quarter, waiſt and forecaſtle ſtantions, have one end ſtopped through the eye of the gangway-ſtantions, with a wall-knot crowned, and are ſet up forward with a laniard through an eye-bolt in the knight-heads, and a thimble turned into the end: the ſame on the quarters. Tiller-rope is white rope, firſt ſtretched, then doubled and marked in the middle; and there nailed to the middle of the ſteering-wheel-barrel: ſeven turns are next taken round the barrel on each ſide in large ſhips, and five in ſmaller; the ends are then paſſed through a groove on each ſide the middle of the deck, under the wheel. To prevent wet going down, over each groove is a ſmall box fitted with a ſliding top, and a hole juſt ſufficient to admit the rope which traverſes backwards and forwards, as the turns of the rope increaſe or decreaſe upon the wheel, by the helm being put on either ſide; ſometimes a leather collar is nailed on the top, and ſurrounds the rope for 3 or 4 inches high. Each end, paſſing through the holes in the decks, is reeved through vertical ſheaves, ſo fixed in a block, one on each ſide the midſhips cloſe up under the deck in the gun-room, as to direct each end into its reſpective ſide, where it reeves through a horizontal ſheave, fixed in a block at the end of the ſweep; from thence it leads back into midſhips, along a groove made in the back of the ſweep, and is facilitated by rollers, fixed vertically in the back of the ſweep. Each end is then paſſed through an eye, on each ſide of the upper part of a hoop, that is bolted on the fore end of the tiller; the ends are then paſſed under the ſweep, through an eye on each ſide, in the middle of a hoop, driven on the tiller farther aft: laſtly, an iron thimble is turned into each end, with a throat and round ſeizing, and ſets up with a laniard to an eye-bolt, driven in each ſide of the tiller, farther aft. In large ſhips it ſets up with a gun-tackle-purchaſe.

When the tiller is worked upon deck, the tiller-rope is ſtretched, middled, and marked, and placed on the wheel as before: then reeved through a ſwivel-block, faſtened on each ſide the middle of the deck, under the wheel; and through another that is laſhed to an eye-bolt on each ſide of the ſhip: then brought into midſhips, to an eye, on each ſide of the hoop on the head of the tiller; and is there ſeized or ſpliced with a thimble.

RUDDER-PENDENTS hook to the ring, in the end of the rudder-chains; the hook is mouſed; then ſtopped to hooks driven in the counter, over the rudder, at the quarters, and one between. A long tackle is hooked to a thimble, ſpliced in the ends of the pendents, and to an eye-bolt in the mizen-chains, and the fall leads in, through a port, upon the quarter-deck.

SKIATIC-STAY, for hoiſting and lowering burdens out, or in, of ſhips, clinches or makes faſt with two half-hitches, and the ends ſtopt, round the heads of the main and fore maſts, with a tackle depending from it over the hatchway.

SPANNING of BOOMS is performed by paſſing a rope alternately at angles from one ſide to the other round the outſide boom, ſpar, or topmaſt, ſo as to confine them from rolling about.

SPANNING of RUNNERS is taking ſeveral turns round both runners abaft the maſt, and frapping the turns.

STERN-LADDERS are made of cable-laid rope thus: double the rope, that it may be long enough to reach the water, nearly, from the upper part of the ſtern: then ſplice an eye in each end, or make an eye in the middle, by ſplicing the ends together, and a ſeizing. The ſteps are commonly tree-nails, thruſt horizontally through the ſtrands of the rope on each ſide, fixteen inches aſunder, and a ſcore is cut round the middle, for the concluding-line, or middle rope, which is faſtened round every ſtep

with a clove-hitch in the fcore. The ladders are lafhed to an eye-bolt, in the upper part of the quarter-piece or ftern, one on each fide.

STOPPERS. Shroud-ftoppers, ufed to confine a fhroud together where injured, are of different lengths and fizes; have a double wall-knot, crowned, and a laniard, made of fennit, at each end. When ufed, one laniard is paffed round the fhroud and ftopper, with feveral turns above, and with the laniard the fame below, the wound and the end put under the laft turn, and jambed. FORE-TACK AND SHEET STOPPERS, for fecuring the tacks and fheets till belayed, are of hawfer-laid rope, about ten feet long, have an eye fpliced in one end, the other end opened out, and made felvagee fafhion three-fourths the length. In large fhips the fore-tacks lead in under the forecaftle, and the ftopper reeves through the eye round the topfail-fheet-bitts, and clap on the tack, with a round turn under the ftanding-part, and lead up with feveral turns in the cuntline, and the end held on. MAIN-TACK-STOPPERS are of cable or hawfer-laid rope, about two fathoms long, have a double wall-knot crowned at one end, and a hook and thimble fpliced in the other end, that hooks to a ring-bolt in the fide, and claps on the tack, with feveral turns taken round the tack and ftopper, with the laniard clofe under the knot. FOR DECK, DOG, and BIT, &c. STOPPERS, fee that part of this work which relates to anchoring, &c.

SWIFTERS. Thofe for the bars of capfterns are reeved through holes in the extremities of the bars, fo as to ftrain them firmly together like the fpokes of a wheel.

TOP-BURTON-TACKLES, to fupport the yards, and eafe the lifts, are fometimes hooked to a felvagee, or ftrap, round the outer quarter of topfail-yards, and fwayed tight by their fall upon deck.

TOPPING-LIFT, to fupport the topmaft-ftuddingfail-boom in a gale of wind, is a pendent clinched round the middle of the boom, then led up through a block lafhed to the topmaft-cap; the end is then turned up with a throat and round feizing, and a tackle hooked therein; fets up in the top by its fall. This fhould be done before the fail is fet.

TRAVELLING-BACKSTAYS, ufed in bad weather to fupport the fore and main-topmafts, fplice into a fpan, round the topmaft, under the parral, and fet up in the chains, with a luff-tackle, to an eye-bolt. They travel up and down the topmaft occafionally, with tricing-lines, that fplice into a thimble, on each fide of the fpan, and through blocks feized to the topmaft-treftle-trees, and lead into the top.

WINDING-TACKLE-PENDENT is made faft round the maft-head, with a round turn and two half-hitches. The ftrap of the fourfold-block is thruft through the eye in the end of the pendent, and a toggle driven through the ftrap. It is guyed out to the lower yard, to a block fecurely lafhed, that the block may hang over the fide. The upper-block is connected by its fall to a treble-block below, and the leading-part goes to the jear-capftan through the deck, or is fwayed on by men.

YARD-TACKLES are fometimes carried aft and hooked to eye-bolts in the fide, and ufed to prevent too great a ftrain on the braces in bad weather.

DESCRIPTION OF FOREIGN VESSELS.

CAT

IS a veſſel, uſed by the Northern Nations of Europe, with three maſts and a bowſprit, rigged ſimilar to an Engliſh ſhip; having, however, pole-maſts and no topgallant-ſails. The mizen is with a gaff. Theſe veſſels are ſometimes uſed in the Engliſh Coal-Trade.

BARK

Is a mediterranean-veſſel, with three maſts and no bowſprit; the foremaſt rakes much forward, and carries a latteen-ſail; the main-maſt is a pole-maſt, and carries three ſquare ſails, like the polacre; the mizen-maſt is ſmall, and carries a mizen and a topſail.

Small Engliſh ſhips, having no mizen-topſail, are called barks.

PINKS

Are mediterranean-veſſels, and differ from the xebec only in being more lofty, and not ſharp in the bottom, as they are veſſels of burthen. They have long narrow ſterns, and three maſts, carrying latteen-ſails.

Engliſh-veſſels, with narrow ſterns, are called pinks.

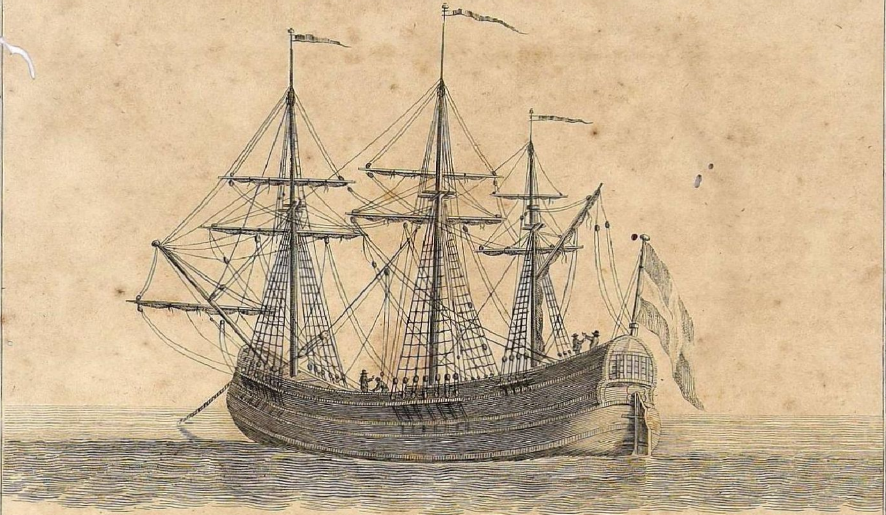
POLACRES

Are merchant-veſſels uſed in the mediterranean. They have three pole-maſts without tops, caps, or croſs-trees, and a bowſprit of one piece. They have bolſters fixed, as a ſtop to the ſhrouds, ſtays, &c. The mizen-maſt is ſometimes not in one piece. Their rigging is light, having no topmaſt-ſhrouds, &c. but a rope-ladder is fixed inſtead, from the maſt-heads to the upper part of the lower rigging. They carry the ſame ſails as a ſhip, and have ſquare yards; all of which, except the lower yards, are without horſes; for they ſtand upon the lower yards to looſe or furl the topſails, and upon the topſail-yards to looſe or furl the topgallant-ſails, as the yards are eaſily lowered for that purpoſe.

POLACRE-SETTEE

Is a veſſel with three maſts, uſually navigated in the levant or mediteranean. Theſe veſſels are generally rigged with ſquare-ſails upon the main and mizen maſt, and a latteen-ſail upon the foremaſt, like a xebec; and ſometimes a latteen-ſail upon the mizen-maſt, and only ſquare-ſails on the main-maſt. The main-maſt ever keeps the rigging of the polacre.

NORWEGIAN CAT



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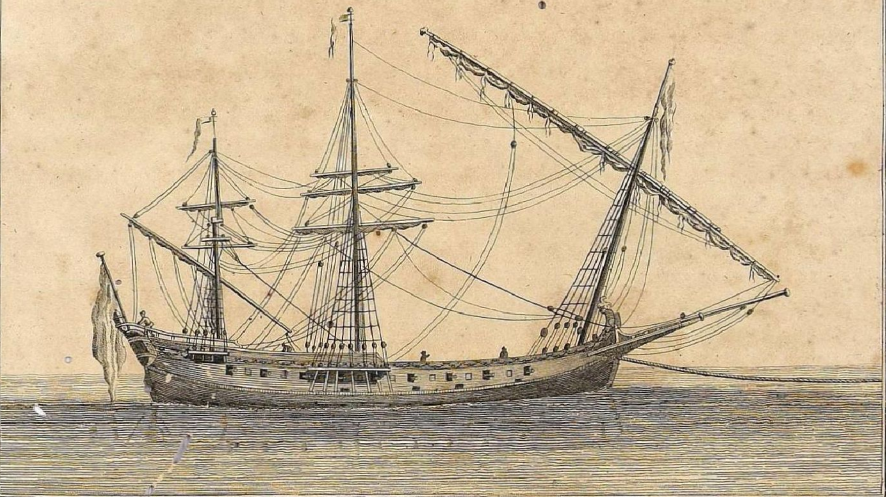

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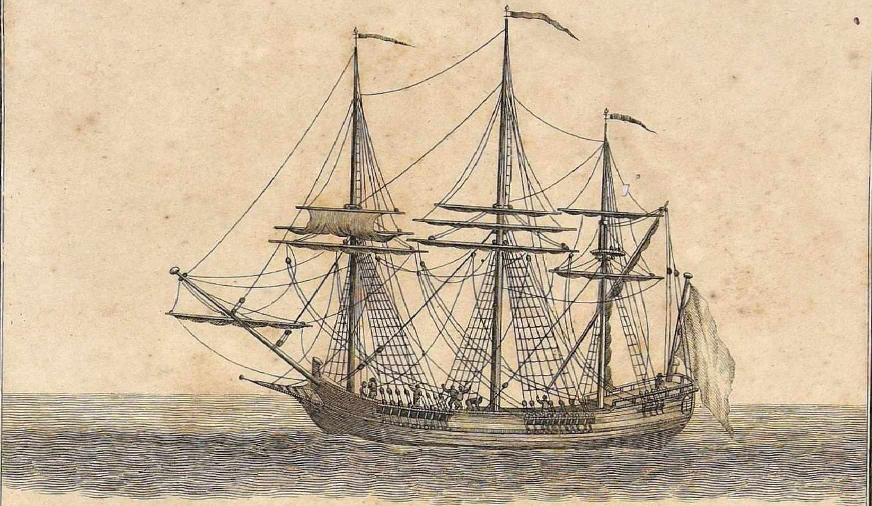
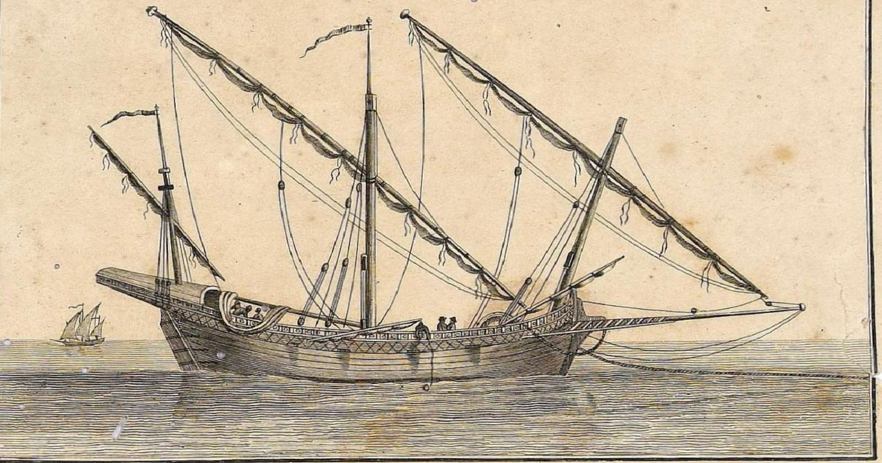
POLACRE



PINK



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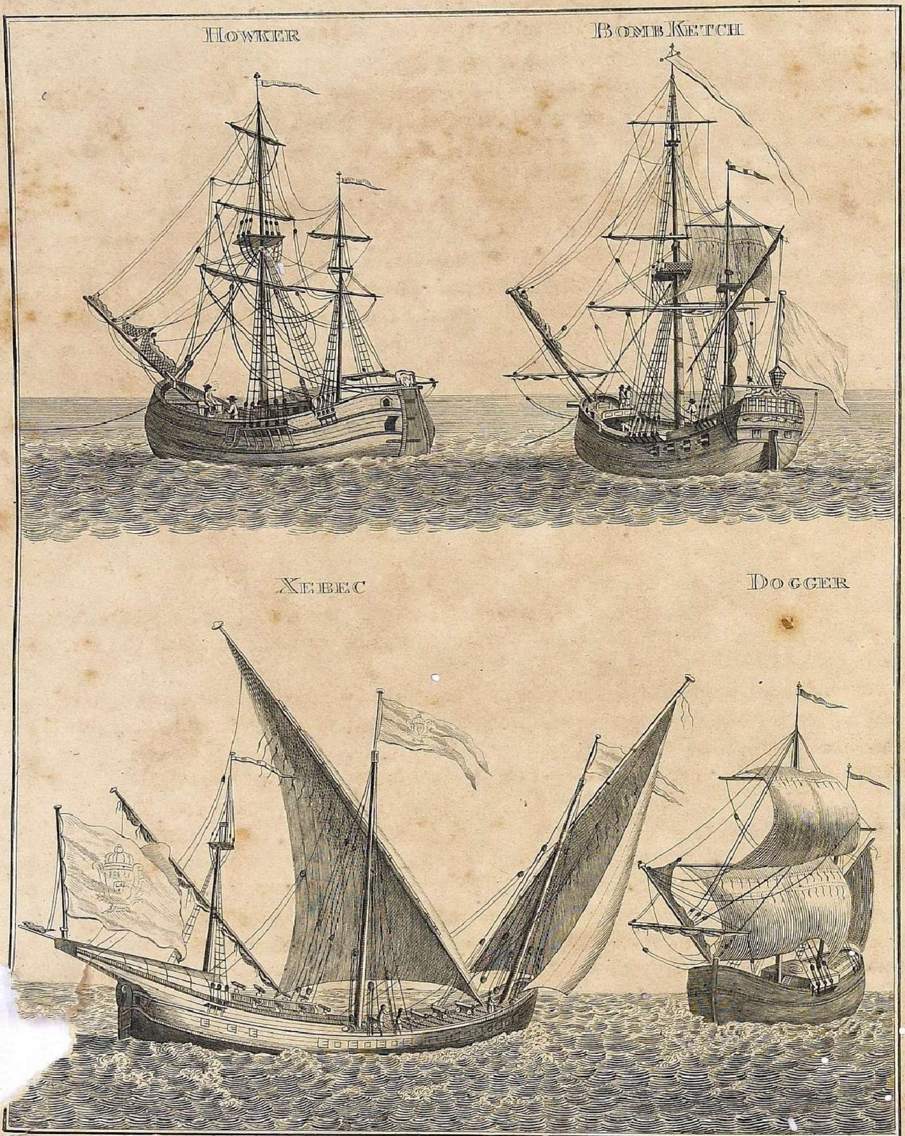

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XEBEC.

A ſmall veſſel with three maſts, navigated in the mediterranean. The fore and main-maſts are called block-maſts, being ſhort, and formed ſquare at the head, to receive ſheaves, to reeve the jeers, &c. The mizen-maſt is fitted with a topmaſt, &c. ſimilar to a ſmall Engliſh ſhip, and which has been lately added, to keep them better to the wind.

They have no bowſprit, but a ſort of boomkin woolded and confined to the prow nearly horizontal, (ſee the galley,) to the outer end of which lead the bowlines. The fore-maſt rakes much forward, has no ſtay, and the ſhrouds ſet up, ſimilar to the runners in Engliſh-cutters or ſloops, to toggles fixed in the ſides. Theſe ſhrouds are eaſily ſhifted when the veſſels go about. The main-maſt is nearly upright, and rigs as the fore-maſt. Each maſt carries a large latteen-ſail, the longeſt ſide of which is bent to a yard, that hoiſts by a parral round the maſt, at about one-third its length, the yards are worked at the lower end by bowlines, and the ſail extended by a ſheet at the clue. The upper lee-yard-arm is worked by a brace, and the ſtrain ſupported by vangs nearer the maſt. The mizen-maſt carries a latteen-ſail, ſimilar to the main and fore-maſt. When the wind is favourable, they carry ſquare-ſails, and ſmaller latteen-ſails, when it blows hard.

Veſſels with latteen-ſails will lie one point nearer the wind than a ſquare-rigged veſſel.

Xebecs, particularly in France, have been rigged ſimilar to polacres, but they never ſail ſo well as they did in their primitive ſituation.

BOMB-KETCHES

Are veſſels with two maſts, uſed by the French. The maſts are placed, and rigged with ſails, as the main and mizen maſts of a ſhip. Upon the bowſprit, and between that and the main-maſts, they have ſtayſails, and a very large jib.

Theſe veſſels diſcharge their ſhells from forward; and, when the ſhell is to be thrown, have an iron chain, (inſtead of a main-ſtay,) preventer-ſhrouds, the backſtays doubled, and the yards ſecured againſt the ſhock it receives.

Engliſh bomb-veſſels were formerly rigged as ketches, but of late years like ſhips.

HOWKER.

A veſſel of burthen with two maſts, (main and mizen,) uſed by the Dutch and Northern nations. The main-maſt is one ſtick, on which are hoiſted three ſquare ſails, as in a ſhip, or only a mainſail and topſail. The mizen-maſt has a topmaſt and topſail; and, abaft the maſt, a ſail ſimilar to a ſhip's driver. They have a long ſlender bowſprit, on which are ſet a ſpritſail and two or three jibs. The Danes have veſſels of war, called howkers, which are a ſort of ſloop-of-war with three maſts.

DOGGER.

A ſtrong veſſel with two maſts, uſed by the Dutch, &c. for fiſhing in the German-ſea, an[illegible] dogger-bank. On the main-maſt are ſet two ſquare-ſails; on the mizen-maſt a gaff-ſail; and, [illegible] that, a topſail: alſo a bowſprit with a ſpritſail, and two or three jibs.

KOFFS

Are Dutch veſſels of burthen, with a main and fore maſt, and a large ſpritſail ſet abaft each. Thus they ſail very cloſe to the wind; but, when the wind is aft, they carry flying topſails, and a ſquare-ſail upon the foremaſt, and upon the bowſprit two or three jibs.

GALLEYS

Are veſſels, navigated with ſails and oars in the mediterranean; they have two maſts, ſimilar to the xebec, but more upright. Abaft the maſt-heads is a ſort of top like a caſe, made and ſurrounded by rails that croſs at right angles. The main-maſt is ſupported by ten pair of ſhrouds, and the fore-maſt has five pair; they ſet up with laniards, reeved through long flat double-blocks one fixed in the end of the ſhroud, the other by a toggle to a timber-head in the ſide. The yards and ſails are the ſame as the xebecs.

When the wind is moderate, a mainſail, with a much greater ſurface, called the large mainſail, is ſubſtituted: and, when the wind freſhens, a ſmall one, called the foul-weather-ſail, is uſed. Similar changes take place in the ſails forward. When the wind is right aft, one ſail is ſet on the ſtarboard-ſide, and its lower yard-arm and bowline on the larboard ſide; at the ſame time, the other ſail is ſet on the larboard-ſide, and its lower yard-arm and bowline on the ſtarboard-ſide: this is called ſetting the ſails in the form of hares' ears. When the wind blows aft and very freſh, a ſquare-ſail, called a croſs-jack, is ſet on the foremaſt.

When rowing againſt the wind, the yards are lowered and ſtowed amidſhips.

HALF AND QUARTER GALLEYS

Are rigged and navigated the ſame as galleys; and take this denomination from their being much ſhorter.

BOMBAY-GALLEYS

Are like the former, but ſmaller, and moſtly uſed by corſairs on the coaſt of barbary.

SETTEE.

A veſſel uſed in the mediterranean, rigged and navigated ſimilar to xebecs or galleys, with ſettee-ſails, inſtead of latteen-ſails.

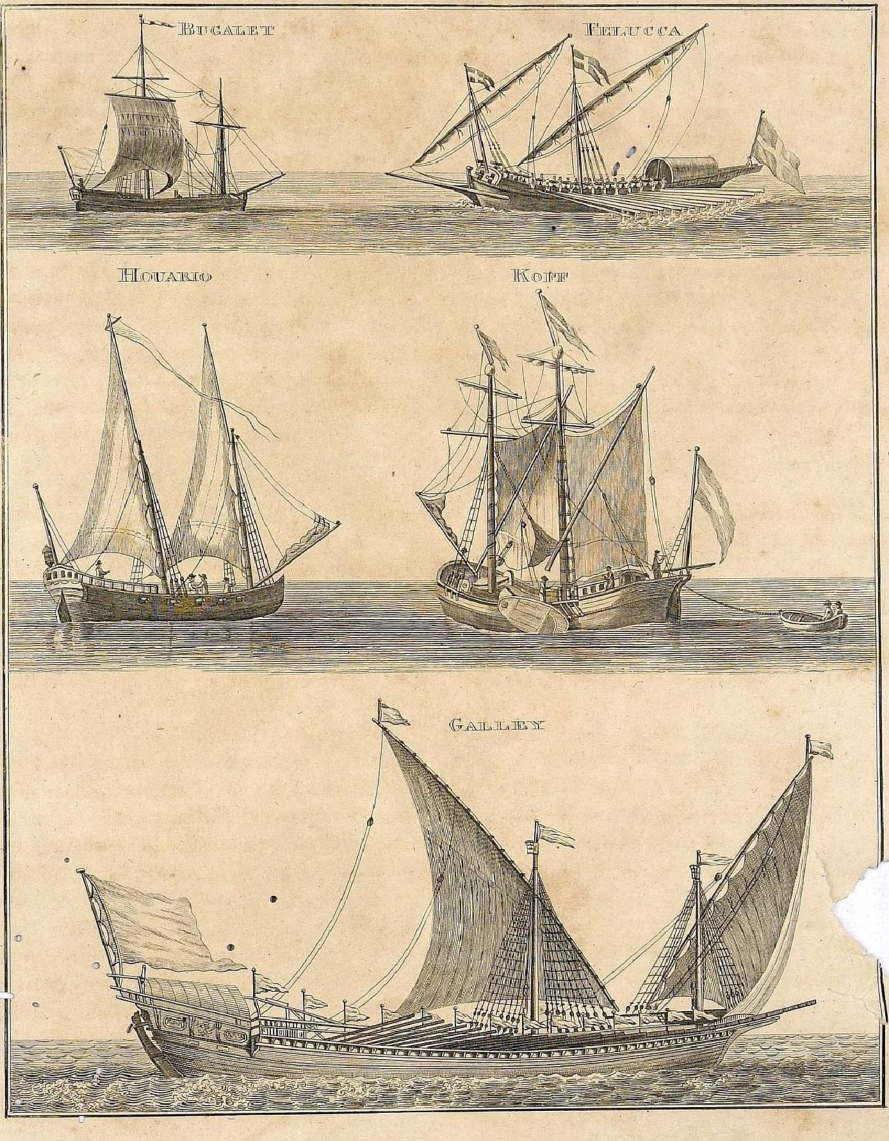
FELUCCA.

A ſmall veſſel uſed in the mediterranean, rigged and navigated ſimilar to galleys; but ſeldom go out of ſight of the coaſt.

HOUARIOS.

Small veſſels with two maſts and a bowſprit, ſometimes uſed as coaſters or pleaſure boats, in inlets and rivers of the mediterranean. Abaft the maſts are ſet latteen-ſails, with ſliding-topmaſts. The [illegible] part of the ſail is bent to hoops that encircle the lower or ſtanding maſt; and the upper part [illegible] ſail is laced to the topmaſt, which ſlides up and down the lower maſt, by grommets or iron [illegible]ened to the heel of the topmaſt. The ſail is faſtened, at the lower part, with a tack to the [illegible]nd, at the peek, with a ſmall earing.

[illegible]ne ſail is hoiſted by a haliard, one end faſtened to the heel of the topmaſt, and the other end reeved through a ſheave-hole in the lower maſt-head; it leads down towards the heel of the maſt, and there belays. The ſail is extended by a ſheet, faſtened to the clue, and led aft. To the heel of the top-maſt is ſometimes faſtened a down-haul-rope, that leads down towards the heel of the maſt. Theſe ſails furl in a cloſe manner to the lower-maſt, by lowering the topmaſts, and confining the ſail in folds, by a furling-line. On the bowſprit is ſpread a jib, which aſſiſts the veſſel in going about. Theſe ſails are called ſliding-gunters, and uſed in the Engliſh navy's pinnaces and barges.



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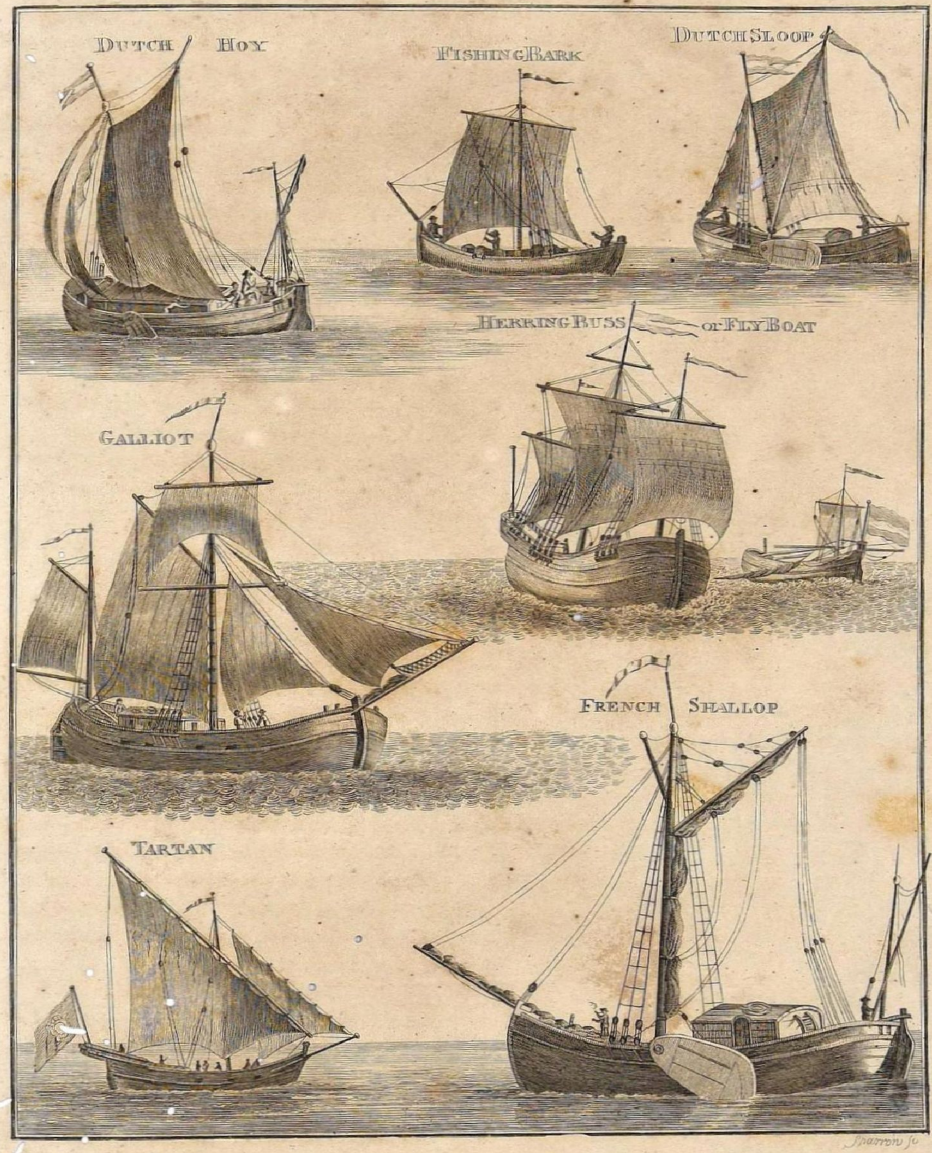

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GALLIOT

Is a large Dutch veſſel, of burthen, with one maſt and a bowſprit. The maſt is ſupported by 4 or 5 pair of ſhrouds, and a ſtay which ſets up to the ſtem. Over this ſtay is another, that leads to the bowſprit-end. Abaft the maſt they carry a large gaff or ſpritſail, and over it a flying topſail, a ſtayſail upon the main-ſtay, and one or two jibs on the bowſprit, Sometimes a ſmall maſt is ſtepped quite aft, abaft which is ſet a gaff or ſpritſail, hauled out to a boom at the foot.

FRENCH SHALLOP.

A large decked ſloop, of burthen, uſed in Holland and Flanders, having one maſt, carrying a gaff-mainſail. On the foreſide of the maſt, above the gaff, is a ſhort ſpar projecting forwards; to which is bent a long narrow ſail, the tack of which is made faſt to the ſtem, and the ſheet to the ſide near the ſhrouds. On the bowſprit are ſet two or three jibs; and a ſmall maſt is often fixed abaft, that carries a mizen.

DUTCH HOYS

Are ſmall veſſels with one maſt, that carries a ſpritſail, a foreſail ſet to the ſtem, and a jib upon a ſhort bowſprit. Sometimes they have a ſhort maſt abaft, that carries a ſmall ſpritſail.

DUTCH SLOOPS

Are ſmall veſſels uſed upon the Canals in Holland. They have one maſt, on which are hoiſted a ſpritſail and a foreſail, ſet cloſe to the ſtem. There are many fiſhing boats in Holland rigged the ſame way, with the addition of a bowſprit and jib, and they are then called pinks. Their ſails are generally tanned.

BUSS.

A Dutch fiſhing-veſſel with three ſhort maſts, each in one piece. On each is carried a ſquare-ſail, and ſometimes a topſail above the mainſail. In fine weather they add a ſort of ſtuddingſail to the lower ſails, and a driver. Occaſionally they add a jib forward, upon a ſmall bowſprit or ſpar.

To ſhoot their nets they lower the main and fore maſts, which fold on deck by large hinges, and ſtow aft upon crotches.

BUGALET.

A ſmall veſſel with two maſts, uſed on the coaſt of Brittany. The foremaſt is very ſhort; and on each maſt is carried a ſquare-ſail, and ſometimes a topſail over the mainſail. They have a bowſprit, and ſet one or two jibs.

FISHING-BARKS

Are ſmall veſſels with one maſt, uſed for fiſhing, &c. by the Spaniards. On the maſt they c a ſquare mainſail, with a jib upon the bowſprit.

TARTAN.

A ſmall veſſel navigated along the coaſt of the mediterranean. They have one maſt and a bow A large latteen-ſail is carried on the maſt, ſimilar to a xebec, and a large jib forwards.

When the wind is aft, a ſquare-ſail is hoiſted like a croſs-jack.

BEAN-COD.

A ſmall fiſhing veſſel or pilot boat, uſed by the Portugueſe, and rigs with one maſt, ſimilar to the tartan.

JUNKS

Are large flat-bottomed veſſels, from 100 to 500 tons burthen, uſed by the Chineſe. They have three maſts, and a ſhort bowſprit placed on the ſtarboard-bow. The maſts are ſupported by two or three ſhrouds, which at times are all carried on the windward-ſide. On the fore and main maſt is hoiſted a ſort of lug-ſail, made of cane or bamboo. Theſe ſails are confined by iron travellers, that encircle the maſt, and fix to bamboos at ſeveral diviſions on the ſail. The ſail is kept to the wind by two ropes, faſtened to wood ſtirrups, fixed to the foot of the ſail, and lead to the maſt-head. The lee part of the ſail is hauled aft, by a rope that branches into ſhort legs, that are made faſt to each fold of the ſail.

On the mizen-maſt is a gaff-ſail, made of coarſe cotton, a topſail made of the ſame is carried on the main-maſt; alſo a jib and ſpritſail, that are ſet on the bowſprit.

PARDOS.

Veſſels uſed in the Chineſe ſeas, both for trade and war, not ſo large as junks, but ſimilar, except that their ſails are ſlackly laced by one ſide to the maſts, inſtead of being ſuſpended by a yard.

CHAMPANS

Are ſmall flat-bottom veſſels, uſed by the Chineſe and Japaneſe. They have one maſt, rigged the ſame as the main-maſt of a junk, with a ſingle ſail made of cane. They ſeldom exceed 80 tons burthen; are conſtructed without iron or nail; and are unfit for rough weather.

JAPANESE BARKS

Are veſſels ſimilar to junks, 80 or 90 feet long on one deck, but which have only one maſt, that carries a ſquare-ſail, and forward one or two jibs made of cotton. They only uſe ſails when the wind is large.

CARACORES

Are light veſſels uſed by the natives of Borneo, and iſlands adjacent, and by the Dutch as guarda coſtas in thoſe latitudes. They are high at each end, and chiefly navigated with paddles, to uſe which they ſet both within and without board, on narrow platforms of reeds, ſupported by bars rigged out acroſs the veſſel, and one at the outer end on each ſide, which ſerve as balances to prevent its being upſet. By placing 3 or 4 ranks of rowers on the platform of reeds outſide, and ſome within, they can multiply their number ſo as to produce a very great velocity. They have triple-ſheers of [torn]mboo for a maſt ſupported by ſhrouds, on which is hoiſted an oblong ſail, bent to a ſort of bamboo [torn]d at the head, and a boom at the foot. The ſail is hauled aft by a ſheet, the yard has a bowline [torn]o windward, and a brace or vang that leads aft. The ſail rolls up or furls by a winch at the [torn] the boom.

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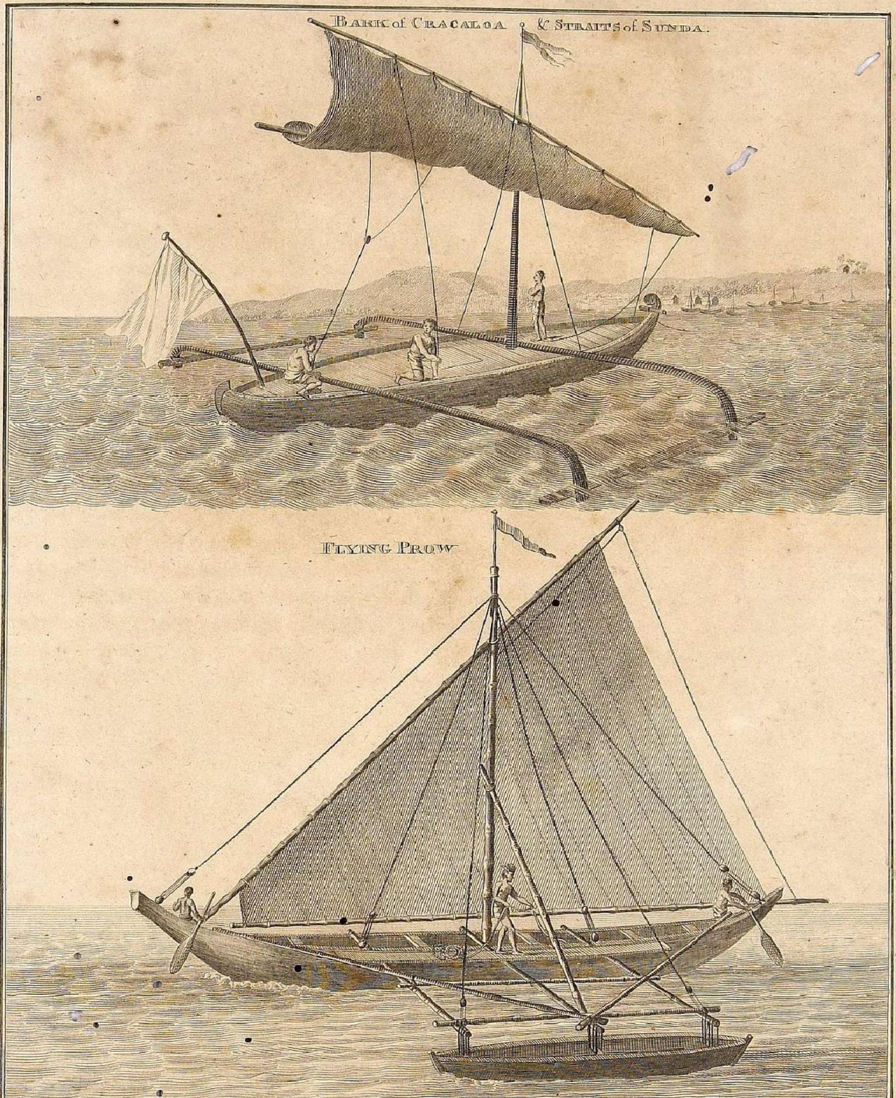

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BARKS OF CRACALOA AND STRAITS OF SUNDA

Are veſſels with fluſh decks, high ſheer, and ſharp forward. They have one maſt, and the ſail is ſimilar to the caracores, being long and narrow. Theſe veſſels are kept from upſetting by a ſort of beams croſſing the veſſel and bending downwards at the ends, which faſten to a long round or flat piece of timber.

FLYING-PROW.

A ſort of narrow canoe, about 2 feet broad and 36 long, uſed about the Ladrone iſlands. Their lee ſide is flat, and the weather ſide round. A maſt is ſtept in the weather gunwale; and to the ſame ſide is fixed a frame compoſed of bamboo, projecting out about 11 feet; under the extremity of which, and parallel to the veſſel, is ſuſpended an oblong block of wood, formed and hollowed like a canoe, and thus a balance is produced, which prevents the prow's upſetting; for the weight of the frame (which may be and is ſometimes increaſed by men running out upon it, according to the exigency) prevents its falling over to lee-ward; and the floating properties of the hollowed block of wood at the extremity of the frame, reſiſt the tendency of rolling over to windward. This conſtruction is ſo extremely light, that ſhe ſeems to feel no reſiſtance in her paſſage through the water.

Their rigging conſiſts of two ſtays, that ſet up at the ends of the prow, and four ſhrouds that ſet up at the four corners of the frame. The maſt-yard, and boom, are of bamboo. The ſail is made of mat, ſhaped like a ſettee-ſail: the lower end of the yard is confined forward in a ſhoe. In going about, they keep her way ſo, that the ſtern becomes the head; and, to ſhift the ſail, the yard is raiſed, and the lower end taken along the gunwale, and fixed in a ſhoe as before; the boom is ſhifted at the ſame time, by ſlackening the ſheet, and peeking the boom up a long the maſt, then by hauling upon another ſheet, the end of the boom is brought to where the lower yard-arm was before, and is hauled aft at the other end. They are ſteered by paddles at each end.

PROWS, OF THE MULGRAVE-ISLANDS,

Differ little from the former, as may be beſt ſeen by a reference to the plates.

PERIAGUAS

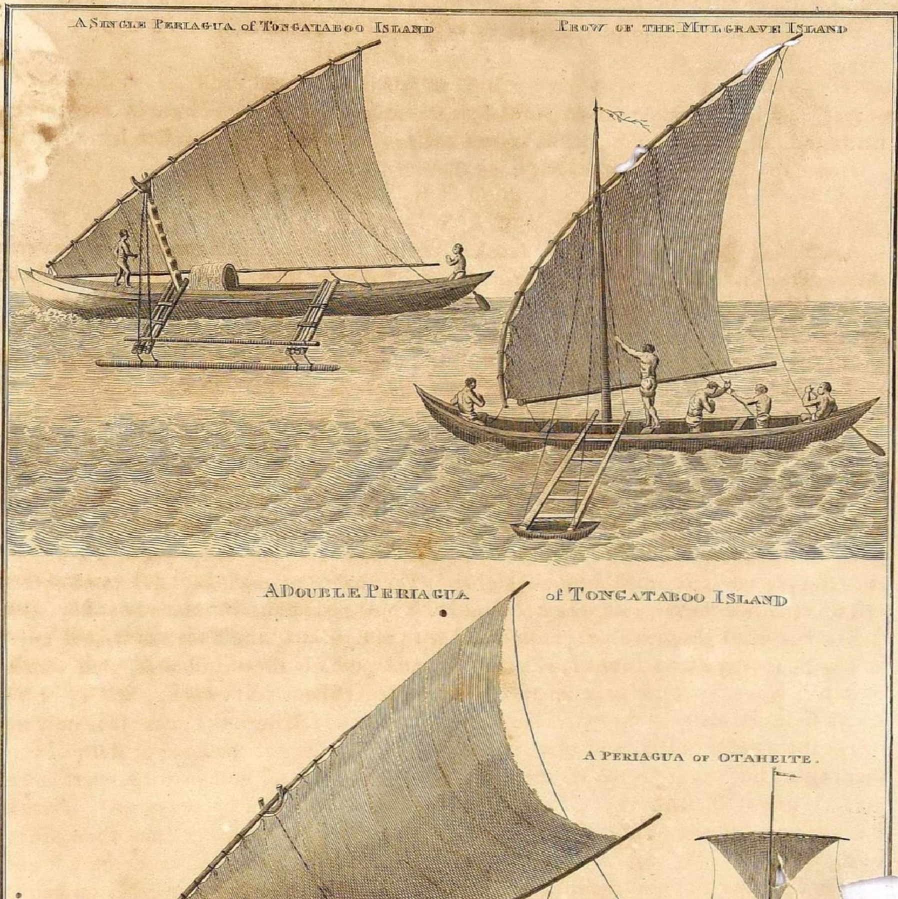
Are double and ſingle canoes, uſed by the natives of ſeveral iſlands in the ſouth ſeas. Their maſts and ſails having ſo much the reſemblance of prows and other veſſels already deſcribed, that a reference to the plates is more elucidating than any deſcription.

BOMBAY-BARKS, CALLED DINGAS

Are veſſels uſed at Bombay and places adjacent; and are navigated ſometimes by rowing with paddles. They have one maſt, one-third the length from the ſtem, which rakes much forward. On the maſt is hoiſted a ſail, bent to a long yard, reſembling a ſettee-ſail. The tack is made faſt to the head of the ſtem, and the ſheet to the heel of the maſt. Theſe veſſels never tack, but wear, in doing which they peek the yard againſt the maſt to ſhift the ſail; at the ſame time they paſs the ſheet before the maſt. Their rigging conſiſts of a pair of haliards, a bowline, and brace. Their keels are very much hollowed upwards, to avoid wholly grounding on ſand banks.

BALSAS, OR CATAMARAN.

A raft made of the trunks of the balſa, an extremely light wood, laſhed together, and uſed by the Indians and Spaniards in South America. The largeſt have 9 trunks of 70 or 80 feet in length, are from 20 to 24 feet wide, and from 20 to 25 tons burthen. There is always an odd log, longer than the reſt, placed in the middle projecting aft. They have but one maſt, in form of ſheers, whoſe heels reſt on each ſide the raft; on which is hoiſted a large ſquare-ſail. When a fore-ſtayſail is ſet, a pair of ſheers is rigged forward. Theſe rafts run with foul winds, and ſteer, as well as any other kind of veſſel, by means of an invention ſimilar to, and perhaps the original of, that which is called "A SLIDING KEEL." They have for this purpoſe planks about 10 feet long, and 15 or 18 inches wide, which ſlide vertically in the ſpaces between the trunks which form the raft. It is only neceſſary to immerge them more or leſs, and place a greater or leſs number at the head or ſtern of the raft, to make them either luff to, or keep from the wind, tack, wear, lie-to, and perform every neceſſary manoeuvre. If one of theſe planks be drawn up forward, the raft will keep away; and, if one is raiſed abaft, ſhe will come to the wind. The number of theſe planks is five or ſix; and their uſe is ſo eaſy, that, ...ng once underway, they work but one of them, drawing it up, and immerging it one or two feet as ... be neceſſary. The demonſtration of the theory of working of ſhips, (given hereafter) will con... ...he effects of this conſtruction; which might perhaps be well adapted to many caſes of emergency, ...hipwreck upon coaſts, deſtitute of all other materials for ſhip-building.



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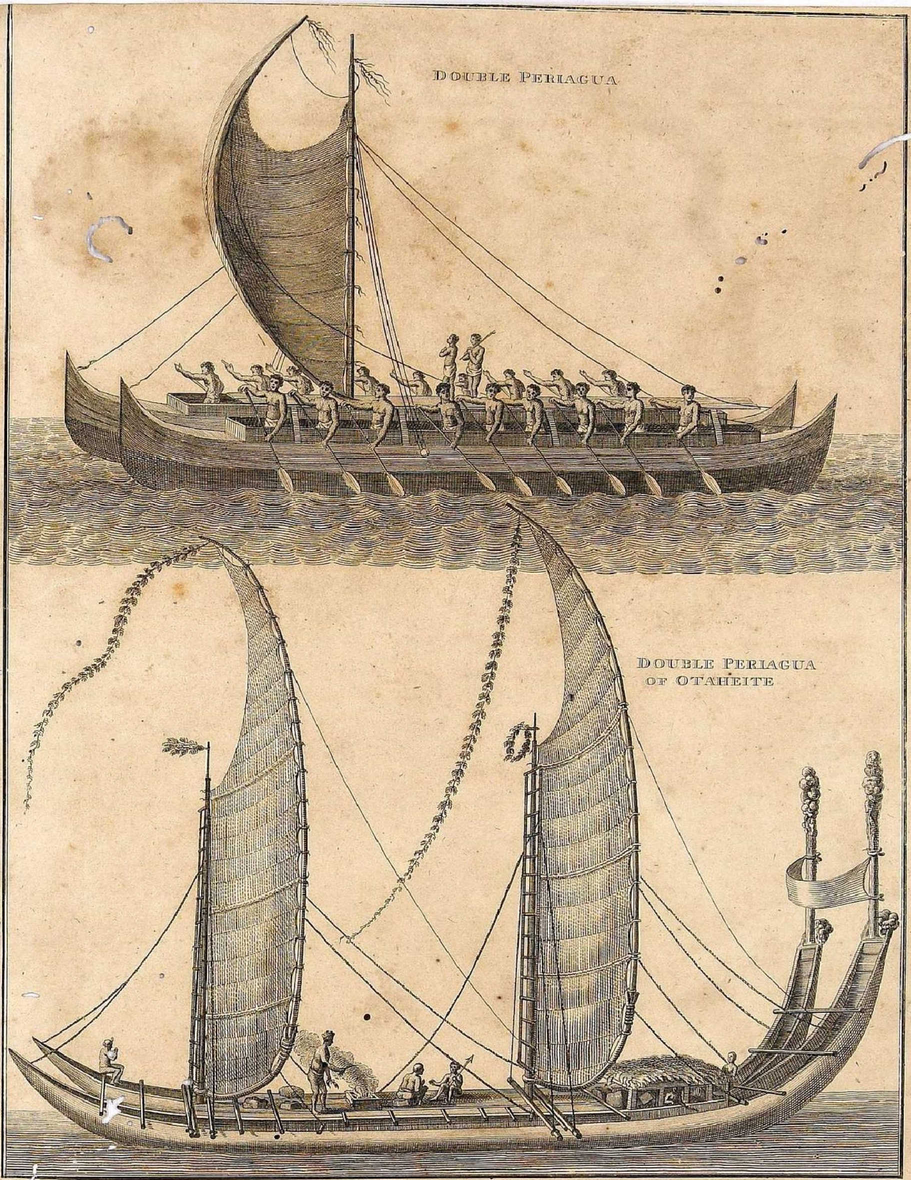

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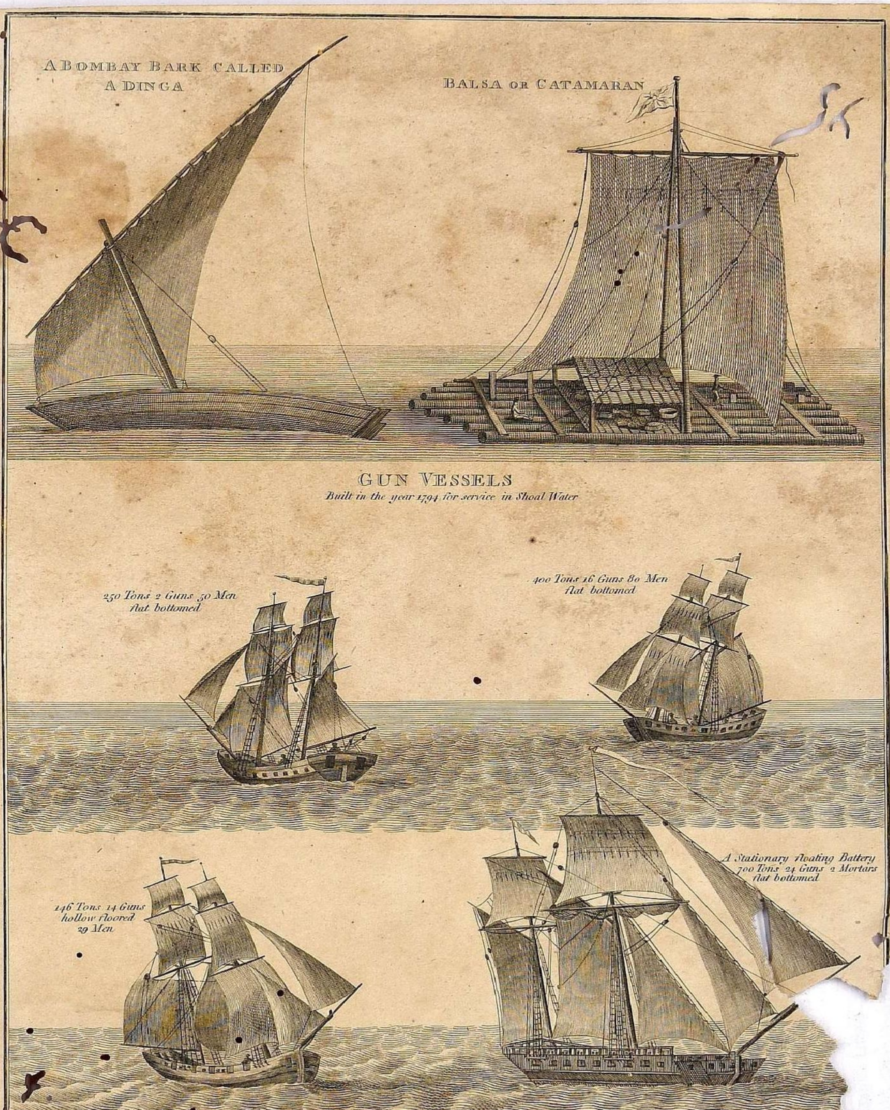

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